SEQUENCE LISTING

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LARDIZABAL, KATHRYN D.
LASSNER, MICHAEL

<120> NUCLEIC ACID SEQUENCES ENCODING A PLANT CYTOPLASMIC PROTEIN INVOLVED IN FATTY ACYL-COA METABOLISM

<130> 16518.025

<140> 08/657,749
<141> 1996-05-30

<150> PCT/US94/13686
<151> 1994-11-30

<150> 08/265,047
<151> 1994-06-23

<150> 08/160,602
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<150> 08/066,299
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<170> PatentIn Ver. 2.1

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gat aac aaa gcc att ttg gtc act ggt gct act ggc tcc tta gca aaa 160
Asp Asn Lys Ala Ile Leu Val Thr Gly Ala Thr Gly Ser Leu Ala Lys
15 20 25

att ttt gtg gag aag gta ctg agg agt caa ccg aat gtg aag aaa ctc 208
Ile Phe Val Glu Lys Val Leu Arg Ser Gln Pro Asn Val Lys Lys Leu
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tat ctt ctt ttg aga gca acc gat gac gag aca gct gct cta cgc ttg 256
Tyr Leu Leu Leu Arg Ala Thr Asp Asp Glu Thr Ala Ala Leu Arg Leu
45 50 55

caa aat gag gtt ttt gga aaa gag ttg ttc aaa gtt ctg aaa caa aat 304
Gln Asn Glu Val Phe Gly Lys Glu Leu Phe Lys Val Leu Lys Gln Asn
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tta ggt gca aat ttc tat tcc ttt gta tca gaa aaa gtg act gta gta 352
Leu Gly Ala Asn Phe Tyr Ser Phe Val Ser Glu Lys Val Thr Val Val
80 85 90

ccc ggt gat att act ggt gaa gac ttg tgt ctc aaa gac gtc aat ttg 400
Pro Gly Asp Ile Thr Gly Glu Asp Leu Cys Leu Lys Asp Val Asn Leu
95 100 105

aag gaa gaa atg tgg agg gaa atc gat gtt gtt gtc aat cta gct gct 448
Lys Glu Glu Met Trp Arg Glu Ile Asp Val Val Val Asn Leu Ala Ala
110 115 120

aca atc aac ttc att gaa agg tac gac gtg tct ctg ctt atc aac aca 496
Thr Ile Asn Phe Ile Glu Arg Tyr Asp Val Ser Leu Leu Ile Asn Thr
125 130 135

tat gga gcc aag tat gtt ttg gac ttc gcg aag aag tgc aac aaa tta 544
Tyr Gly Ala Lys Tyr Val Leu Asp Phe Ala Lys Lys Cys Asn Lys Leu
140 145 150 155

aag ata ttt gtt cat gta tct act gct tat gta tct gga gag aaa aat 592
Lys Ile Phe Val His Val Ser Thr Ala Tyr Val Ser Gly Glu Lys Asn
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ggg tta ata ctg gag aag cct tat tat atg ggc gag tca ctt aat gga   640
Gly Leu Ile Leu Glu Lys Pro Tyr Tyr Met Gly Glu Ser Leu Asn Gly
            175                 180                 185

aga tta ggt ctg gac att aat gta gag aag aaa ctt gtg gag gca aaa   688
Arg Leu Gly Leu Asp Ile Asn Val Glu Lys Lys Leu Val Glu Ala Lys
        190                 195                 200

atc aat gaa ctt caa gca gcg ggg gca acg gaa aag tcc att aaa tcg   736
Ile Asn Glu Leu Gln Ala Ala Gly Ala Thr Glu Lys Ser Ile Lys Ser
    205                 210                 215

aca atg aag gac atg ggc atc gag agg gca aga cac tgg gga tgg cca   784
Thr Met Lys Asp Met Gly Ile Glu Arg Ala Arg His Trp Gly Trp Pro
220                 225                 230                 235

aat gtg tat gta ttc acc aag gca tta ggg gag atg ctt ttg atg caa   832
Asn Val Tyr Val Phe Thr Lys Ala Leu Gly Glu Met Leu Leu Met Gln
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tac aaa ggg gac att ccg ctt act att att cgt ccc acc atc atc acc   880
Tyr Lys Gly Asp Ile Pro Leu Thr Ile Ile Arg Pro Thr Ile Ile Thr
            255                 260                 265

agc act ttt aaa gag ccc ttt cct ggt tgg gtt gaa ggt gtc agg acc   928
Ser Thr Phe Lys Glu Pro Phe Pro Gly Trp Val Glu Gly Val Arg Thr
        270                 275                 280

atc gat aat gta cct gta tat tat ggt aaa ggg aga ttg agg tgt atg   976
Ile Asp Asn Val Pro Val Tyr Tyr Gly Lys Gly Arg Leu Arg Cys Met
    285                 290                 295

ctt tgc gga ccc agc aca ata att gac ctg ata ccg gca gat atg gtc   1024
Leu Cys Gly Pro Ser Thr Ile Ile Asp Leu Ile Pro Ala Asp Met Val
300                 305                 310                 315

gtg aat gca acg ata gta gcc atg gtg gcg cac gca aac caa aga tac   1072
Val Asn Ala Thr Ile Val Ala Met Val Ala His Ala Asn Gln Arg Tyr
                320                 325                 330

gta gag ccg gtg aca tac cat gtg gga tct tca gcg gcg aat cca atg   1120
Val Glu Pro Val Thr Tyr His Val Gly Ser Ser Ala Ala Asn Pro Met
            335                 340                 345

aaa ctg agt gca tta cca gag atg gca cac cgt tac ttc acc aag aat   1168
Lys Leu Ser Ala Leu Pro Glu Met Ala His Arg Tyr Phe Thr Lys Asn
        350                 355                 360

cca tgg atc aac ccg gat cgc aac cca gta cat gtg ggt cgg gct atg   1216
Pro Trp Ile Asn Pro Asp Arg Asn Pro Val His Val Gly Arg Ala Met
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gtc ttc tcc tcc ttc tcc acc ttc cac ctt tat ctc acc ctt aat ttc   1264
Val Phe Ser Ser Phe Ser Thr Phe His Leu Tyr Leu Thr Leu Asn Phe
380                 385                 390                 395

ctc ctt cct ttg aag gta ctg gag ata gca aat aca ata ttc tgc caa   1312
Leu Leu Pro Leu Lys Val Leu Glu Ile Ala Asn Thr Ile Phe Cys Gln
                400                 405                 410

tgg ttc aag ggt aag tac atg gat ctt aaa agg aag acg agg ttg ttg   1360
Trp Phe Lys Gly Lys Tyr Met Asp Leu Lys Arg Lys Thr Arg Leu Leu
            415                 420                 425

ttg cgt tta gta gac att tat aaa ccc tac ctc ttc ttc caa ggc atc   1408
Leu Arg Leu Val Asp Ile Tyr Lys Pro Tyr Leu Phe Phe Gln Gly Ile
        430                 435                 440

ttt gat gac atg aac act gag aag ttg cgg att gct gca aaa gaa agc   1456
Phe Asp Asp Met Asn Thr Glu Lys Leu Arg Ile Ala Ala Lys Glu Ser
    445                 450                 455

ata gtt gaa gct gat atg ttt tac ttt gat ccc agg gca att aac tgg   1504
Ile Val Glu Ala Asp Met Phe Tyr Phe Asp Pro Arg Ala Ile Asn Trp
460                 465                 470                 475

gaa gat tac ttc ttg aaa act cat ttc cca ggn gtc gta gag cac gtt   1552
Glu Asp Tyr Phe Leu Lys Thr His Phe Pro Gly Val Val Glu His Val
                480                 485                 490

ctt aac taaaagttac ggtacgaaaa tgagaagatt ggaatgcatg caccgaaagn    1608
Leu Asn

ncaacataaa agacgtggtt aaagtcatgg tcaaaaaaga aataaaatgc agttaggttt 1668

gtgttgcagt tttgattcct tgtattgtta cttgtacttt tgatcttttt ctttttaat 1728

gaaatttctc tctttgtttt gtgaaaaaaa aaaaaaaaaa gagctcctgc agaagctt   1786
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Val Leu Arg Ser Gln Pro Asn Val Lys Lys Leu Tyr Leu Leu Leu Arg
         35                  40                  45
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Ala Thr Asp Asp Glu Thr Ala Ala Leu Arg Leu Gln Asn Glu Val Phe
     50                  55                  60

Gly Lys Glu Leu Phe Lys Val Leu Lys Gln Asn Leu Gly Ala Asn Phe
 65                  70                  75                  80

Tyr Ser Phe Val Ser Glu Lys Val Thr Val Val Pro Gly Asp Ile Thr
                 85                  90                  95

Gly Glu Asp Leu Cys Leu Lys Asp Val Asn Leu Lys Glu Glu Met Trp
            100                 105                 110

Arg Glu Ile Asp Val Val Val Asn Leu Ala Ala Thr Ile Asn Phe Ile
        115                 120                 125

Glu Arg Tyr Asp Val Ser Leu Leu Ile Asn Thr Tyr Gly Ala Lys Tyr
    130                 135                 140

Val Leu Asp Phe Ala Lys Lys Cys Asn Lys Leu Lys Ile Phe Val His
145                 150                 155                 160

Val Ser Thr Ala Tyr Val Ser Gly Glu Lys Asn Gly Leu Ile Leu Glu
                165                 170                 175

Lys Pro Tyr Tyr Met Gly Glu Ser Leu Asn Gly Arg Leu Gly Leu Asp
            180                 185                 190

Ile Asn Val Glu Lys Lys Leu Val Glu Ala Lys Ile Asn Glu Leu Gln
        195                 200                 205

Ala Ala Gly Ala Thr Glu Lys Ser Ile Lys Ser Thr Met Lys Asp Met
    210                 215                 220

Gly Ile Glu Arg Ala Arg His Trp Gly Trp Pro Asn Val Tyr Val Phe
225                 230                 235                 240

Thr Lys Ala Leu Gly Glu Met Leu Leu Met Gln Tyr Lys Gly Asp Ile
                245                 250                 255

Pro Leu Thr Ile Ile Arg Pro Thr Ile Ile Thr Ser Thr Phe Lys Glu
            260                 265                 270

Pro Phe Pro Gly Trp Val Glu Gly Val Arg Thr Ile Asp Asn Val Pro
        275                 280                 285

Val Tyr Tyr Gly Lys Gly Arg Leu Arg Cys Met Leu Cys Gly Pro Ser
    290                 295                 300

Thr Ile Ile Asp Leu Ile Pro Ala Asp Met Val Val Asn Ala Thr Ile
305                 310                 315                 320

Val Ala Met Val Ala His Ala Asn Gln Arg Tyr Val Glu Pro Val Thr
                325                 330                 335
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```
Tyr His Val Gly Ser Ser Ala Ala Asn Pro Met Lys Leu Ser Ala Leu
            340                 345                 350

Pro Glu Met Ala His Arg Tyr Phe Thr Lys Asn Pro Trp Ile Asn Pro
        355                 360                 365

Asp Arg Asn Pro Val His Val Gly Arg Ala Met Val Phe Ser Ser Phe
    370                 375                 380

Ser Thr Phe His Leu Tyr Leu Thr Leu Asn Phe Leu Leu Pro Leu Lys
385                 390                 395                 400

Val Leu Glu Ile Ala Asn Thr Ile Phe Cys Gln Trp Phe Lys Gly Lys
                405                 410                 415

Tyr Met Asp Leu Lys Arg Lys Thr Arg Leu Leu Leu Arg Leu Val Asp
            420                 425                 430

Ile Tyr Lys Pro Tyr Leu Phe Phe Gln Gly Ile Phe Asp Asp Met Asn
        435                 440                 445

Thr Glu Lys Leu Arg Ile Ala Ala Lys Glu Ser Ile Val Glu Ala Asp
    450                 455                 460

Met Phe Tyr Phe Asp Pro Arg Ala Ile Asn Trp Glu Asp Tyr Phe Leu
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Lys Thr His Phe Pro Gly Val Val Glu His Val Leu Asn
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Thr Asn Pro Glu Ile Gln Val Ser Thr Thr Met Thr Thr Thr Thr Thr
             10                  15                  20
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act atg acc gcc act ctc ccc aac ttc aag tcc tcc atc aac tta cac   152
Thr Met Thr Ala Thr Leu Pro Asn Phe Lys Ser Ser Ile Asn Leu His
         25                  30                  35

cac gtc aag ctc ggc tac cac tac tta atc tcc aat gcc ctc ttc ctc   200
His Val Lys Leu Gly Tyr His Tyr Leu Ile Ser Asn Ala Leu Phe Leu
     40                  45                  50

gta ttc atc ccc ctt ttg ggc ctc gct tcg gcc cat ctc tcc tcc ttc   248
Val Phe Ile Pro Leu Leu Gly Leu Ala Ser Ala His Leu Ser Ser Phe
 55                  60                  65                  70

tcg gcc cat gac ttg tcc ctg ctc ttc gac ctc ctt cgc cgc aac ctc   296
Ser Ala His Asp Leu Ser Leu Leu Phe Asp Leu Leu Arg Arg Asn Leu
                 75                  80                  85

ctc cct gtt gtc gtt tgt tct ttc ctc ttc gtt tta tta gca acc cta   344
Leu Pro Val Val Val Cys Ser Phe Leu Phe Val Leu Leu Ala Thr Leu
             90                  95                 100

cat ttc ttg acc cgg ccc agg aat gtc tac ttg gtg gac ttt gga tgc   392
His Phe Leu Thr Arg Pro Arg Asn Val Tyr Leu Val Asp Phe Gly Cys
        105                 110                 115

tat aag cct caa ccg aac ctg atg aca tcc cac gag atg ttc atg gac   440
Tyr Lys Pro Gln Pro Asn Leu Met Thr Ser His Glu Met Phe Met Asp
    120                 125                 130

cgg acc tcc cgg gcc ggg tcg ttt tct aag gag aat att gag ttt cag   488
Arg Thr Ser Arg Ala Gly Ser Phe Ser Lys Glu Asn Ile Glu Phe Gln
135                 140                 145                 150

agg aag atc ttg gag agg gcc ggt atg ggt cgg gaa acc tat gtc ccc   536
Arg Lys Ile Leu Glu Arg Ala Gly Met Gly Arg Glu Thr Tyr Val Pro
                155                 160                 165

gaa tcc gtc act aag gtg ccc gcc gag ccg agc ata gca gca gcc agg   584
Glu Ser Val Thr Lys Val Pro Ala Glu Pro Ser Ile Ala Ala Ala Arg
            170                 175                 180

gcc gag gcg gag gag gtg atg tac ggg gcg atc gac gag gtg ttg gag   632
Ala Glu Ala Glu Glu Val Met Tyr Gly Ala Ile Asp Glu Val Leu Glu
        185                 190                 195

aag acg ggg gtg aag ccg aag cag ata gga ata ctg gtg gtg anc tgc   680
Lys Thr Gly Val Lys Pro Lys Gln Ile Gly Ile Leu Val Val Xaa Cys
    200                 205                 210

agc ttg ttt aac cca acg ccg tcg ctg tca tcc atg ata gtt aac cat   728
Ser Leu Phe Asn Pro Thr Pro Ser Leu Ser Ser Met Ile Val Asn His
215                 220                 225                 230
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tac aag ctn agg ggt aat ata ctt agc tat aat ctt ggt ggc atg ggt   776
Tyr Lys Xaa Arg Gly Asn Ile Leu Ser Tyr Asn Leu Gly Gly Met Gly
                235                 240                 245

tgc agt gct ggg ctc att tcc att gat ctt gcc aag gac ctc cta cag   824
Cys Ser Ala Gly Leu Ile Ser Ile Asp Leu Ala Lys Asp Leu Leu Gln
            250                 255                 260

gtt tac cgt aaa aac aca tat gtg tta gta gtg agc acg gaa aac atg   872
Val Tyr Arg Lys Asn Thr Tyr Val Leu Val Val Ser Thr Glu Asn Met
        265                 270                 275

acc ctt aat tgg tac tgg ggc aat gac cgc tcc atg ctt atc acc aac   920
Thr Leu Asn Trp Tyr Trp Gly Asn Asp Arg Ser Met Leu Ile Thr Asn
    280                 285                 290

tgc cta ttt cgc atg ggt ggc gct gcc atc atc ctc tca aac cgc tgg   968
Cys Leu Phe Arg Met Gly Gly Ala Ala Ile Ile Leu Ser Asn Arg Trp
295                 300                 305                 310

cgt gat cgt cgc cga tcc aag tac caa ctc ctt cat aca gta cgc acc   1016
Arg Asp Arg Arg Arg Ser Lys Tyr Gln Leu Leu His Thr Val Arg Thr
                315                 320                 325

cac aag ggc gct gac gac aag tcc tat aga tgc gtc tta caa caa gaa   1064
His Lys Gly Ala Asp Asp Lys Ser Tyr Arg Cys Val Leu Gln Gln Glu
            330                 335                 340

gat gaa aat aac aag gta ggt gtt gcc tta tcc aag gat ctg atg gca   1112
Asp Glu Asn Asn Lys Val Gly Val Ala Leu Ser Lys Asp Leu Met Ala
        345                 350                 355

gtt gcc ggt gaa gcc cta aag gcc aac atc acg acc ctt ggt ccc ctc   1160
Val Ala Gly Glu Ala Leu Lys Ala Asn Ile Thr Thr Leu Gly Pro Leu
    360                 365                 370

gtg ctc ccc atg tca gaa caa ctc ctc ttc ttt gcc acc tta gtg gca   1208
Val Leu Pro Met Ser Glu Gln Leu Leu Phe Phe Ala Thr Leu Val Ala
375                 380                 385                 390

cgt aag gtc ttc aag atg acg aac gtg aag cca tac atc cca gat ttc   1256
Arg Lys Val Phe Lys Met Thr Asn Val Lys Pro Tyr Ile Pro Asp Phe
                395                 400                 405

aag ttg gca gcg aac gac ttc tgc atc cat gca gga ggc aaa gca gtg   1304
Lys Leu Ala Ala Asn Asp Phe Cys Ile His Ala Gly Gly Lys Ala Val
            410                 415                 420

ttg gat gag ctc gag aag aac ttg gag ttg acg cca tgg cac ctt gaa   1352
Leu Asp Glu Leu Glu Lys Asn Leu Glu Leu Thr Pro Trp His Leu Glu
        425                 430                 435
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ccc tcg agg atg aca ctg tat agg ttt ggg aac aca tcg agt agc tca   1400
Pro Ser Arg Met Thr Leu Tyr Arg Phe Gly Asn Thr Ser Ser Ser Ser
    440                 445                 450

tta tgg tac gag ttg gca tac gct gaa gca aaa ggg agg atc cgt aag   1448
Leu Trp Tyr Glu Leu Ala Tyr Ala Glu Ala Lys Gly Arg Ile Arg Lys
455                 460                 465                 470

ggt gat cga act tgg atg att gga ttt ggt tca ggt ttc aag tgt aac   1496
Gly Asp Arg Thr Trp Met Ile Gly Phe Gly Ser Gly Phe Lys Cys Asn
                475                 480                 485

agt gtt gtg tgg agg gct ttg agg agt gtc aat ccg gct aga gag aag   1544
Ser Val Val Trp Arg Ala Leu Arg Ser Val Asn Pro Ala Arg Glu Lys
            490                 495                 500

aat cct tgg atg gat gaa att gag aag ttc cct gtc cat gtg cct aaa   1592
Asn Pro Trp Met Asp Glu Ile Glu Lys Phe Pro Val His Val Pro Lys
        505                 510                 515

atc gca cct atc gct tcg tagaactgct aggatgtgat tagtaatgaa          1640
Ile Ala Pro Ile Ala Ser
    520

aaatgtgtat tatgttagtg atgtagaaaa agaaacttta gttgatgggt gagaacatgt 1700

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Ser Ser Ile Asn Leu His His Val Lys Leu Gly Tyr His Tyr Leu Ile
         35                  40                  45

Ser Asn Ala Leu Phe Leu Val Phe Ile Pro Leu Leu Gly Leu Ala Ser
     50                  55                  60

Ala His Leu Ser Ser Phe Ser Ala His Asp Leu Ser Leu Leu Phe Asp
 65                  70                  75                  80
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Leu Leu Arg Arg Asn Leu Leu Pro Val Val Val Cys Ser Phe Leu Phe
85 90 95

Val Leu Leu Ala Thr Leu His Phe Leu Thr Arg Pro Arg Asn Val Tyr
100 105 110

Leu Val Asp Phe Gly Cys Tyr Lys Pro Gln Pro Asn Leu Met Thr Ser
115 120 125

His Glu Met Phe Met Asp Arg Thr Ser Arg Ala Gly Ser Phe Ser Lys
130 135 140

Glu Asn Ile Glu Phe Gln Arg Lys Ile Leu Glu Arg Ala Gly Met Gly
145 150 155 160

Arg Glu Thr Tyr Val Pro Glu Ser Val Thr Lys Val Pro Ala Glu Pro
165 170 175

Ser Ile Ala Ala Ala Arg Ala Glu Ala Glu Glu Val Met Tyr Gly Ala
180 185 190

Ile Asp Glu Val Leu Glu Lys Thr Gly Val Lys Pro Lys Gln Ile Gly
195 200 205

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210 215 220

Ser Met Ile Val Asn His Tyr Lys Xaa Arg Gly Asn Ile Leu Ser Tyr
225 230 235 240

Asn Leu Gly Gly Met Gly Cys Ser Ala Gly Leu Ile Ser Ile Asp Leu
245 250 255

Ala Lys Asp Leu Leu Gln Val Tyr Arg Lys Asn Thr Tyr Val Leu Val
260 265 270

Val Ser Thr Glu Asn Met Thr Leu Asn Trp Tyr Trp Gly Asn Asp Arg
275 280 285

Ser Met Leu Ile Thr Asn Cys Leu Phe Arg Met Gly Gly Ala Ala Ile
290 295 300

Ile Leu Ser Asn Arg Trp Arg Asp Arg Arg Arg Ser Lys Tyr Gln Leu
305 310 315 320

Leu His Thr Val Arg Thr His Lys Gly Ala Asp Asp Lys Ser Tyr Arg
325 330 335

Cys Val Leu Gln Gln Glu Asp Glu Asn Asn Lys Val Gly Val Ala Leu
340 345 350

Ser Lys Asp Leu Met Ala Val Ala Gly Glu Ala Leu Lys Ala Asn Ile
355 360 365

```
Thr Thr Leu Gly Pro Leu Val Leu Pro Met Ser Glu Gln Leu Leu Phe
    370                 375                 380

Phe Ala Thr Leu Val Ala Arg Lys Val Phe Lys Met Thr Asn Val Lys
385                 390                 395                 400

Pro Tyr Ile Pro Asp Phe Lys Leu Ala Ala Asn Asp Phe Cys Ile His
                405                 410                 415

Ala Gly Gly Lys Ala Val Leu Asp Glu Leu Glu Lys Asn Leu Glu Leu
            420                 425                 430

Thr Pro Trp His Leu Glu Pro Ser Arg Met Thr Leu Tyr Arg Phe Gly
        435                 440                 445

Asn Thr Ser Ser Ser Ser Leu Trp Tyr Glu Leu Ala Tyr Ala Glu Ala
    450                 455                 460

Lys Gly Arg Ile Arg Lys Gly Asp Arg Thr Trp Met Ile Gly Phe Gly
465                 470                 475                 480

Ser Gly Phe Lys Cys Asn Ser Val Val Trp Arg Ala Leu Arg Ser Val
                485                 490                 495

Asn Pro Ala Arg Glu Lys Asn Pro Trp Met Asp Glu Ile Glu Lys Phe
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acg acc atg acc acc acg acc acg acc gcc act ctc ccc aac ttc aag   99
Thr Thr Met Thr Thr Thr Thr Thr Thr Ala Thr Leu Pro Asn Phe Lys
 15                  20                  25                  30

tcc tcc atc aac tta cac cac gtc aag ctc ggc tac cac tac tta atc   147
Ser Ser Ile Asn Leu His His Val Lys Leu Gly Tyr His Tyr Leu Ile
                35                  40                  45
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tcc aat gcc ctc ttc ctc gta ttc atc ccc ctt ttg ggc ctc gct tcg   195
Ser Asn Ala Leu Phe Leu Val Phe Ile Pro Leu Leu Gly Leu Ala Ser
            50                  55                  60

gcc cac ctc tcc tcc ttc tcg gcc cat gac ttg tcc ctg ctc ttc gac   243
Ala His Leu Ser Ser Phe Ser Ala His Asp Leu Ser Leu Leu Phe Asp
         65                  70                  75

ctc ctt cgc cgc aac ctc ctc ccc gtt gtc gtt tgt tct ttc ctc ttc   291
Leu Leu Arg Arg Asn Leu Leu Pro Val Val Val Cys Ser Phe Leu Phe
     80                  85                  90

gtt tta tta gca acc cta cat ttc ttg acc cgg cct agg aat gtc tac   339
Val Leu Leu Ala Thr Leu His Phe Leu Thr Arg Pro Arg Asn Val Tyr
 95                  100                 105                 110

ttg gtg gac ttt gcc tgc tat aag cct cac ccg aac ctg ata aca tcc   387
Leu Val Asp Phe Ala Cys Tyr Lys Pro His Pro Asn Leu Ile Thr Ser
                115                 120                 125

cac gag atg ttc atg gac cgg acc tcc cgg gcc ggg tcg ttt tct aag   435
His Glu Met Phe Met Asp Arg Thr Ser Arg Ala Gly Ser Phe Ser Lys
            130                 135                 140

gag aat att gag ttt cag agg aag atc ttg gag agg gcc ggt atg ggc   483
Glu Asn Ile Glu Phe Gln Arg Lys Ile Leu Glu Arg Ala Gly Met Gly
        145                 150                 155

cgg gaa acc tac gtc ccc gaa tcc gtc act aag gtg ccg ccc gag ccg   531
Arg Glu Thr Tyr Val Pro Glu Ser Val Thr Lys Val Pro Pro Glu Pro
    160                 165                 170

agc ata gca gca gcc agg gcc gag gcg gag gag gtg atg tac ggg gcg   579
Ser Ile Ala Ala Ala Arg Ala Glu Ala Glu Glu Val Met Tyr Gly Ala
175                 180                 185                 190

atc gac gag gtg ttg gag aag acg ggg gtg aag ccg aag cag ata gga   627
Ile Asp Glu Val Leu Glu Lys Thr Gly Val Lys Pro Lys Gln Ile Gly
                195                 200                 205

ata ctg gtg gtg aac tgc agc ttg ttt aac cca acg ccg tcg ctg tca   675
Ile Leu Val Val Asn Cys Ser Leu Phe Asn Pro Thr Pro Ser Leu Ser
            210                 215                 220

tcc atg ata gtt aac cat tac aag ctt agg ggt aat ata ctt agc tat   723
Ser Met Ile Val Asn His Tyr Lys Leu Arg Gly Asn Ile Leu Ser Tyr
        225                 230                 235

aat ctt ggt ggc atg ggt tgc agt gct ggg ctc att tcc att gat ctt   771
Asn Leu Gly Gly Met Gly Cys Ser Ala Gly Leu Ile Ser Ile Asp Leu
    240                 245                 250
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gcc aag gac ctc cta cag gtt tac cgt aac aca tat gtg tta gta gtg   819
Ala Lys Asp Leu Leu Gln Val Tyr Arg Asn Thr Tyr Val Leu Val Val
255                 260                 265                 270

agc aca gaa aac atg acc ctt aat tgg tac tgg ggc aat gac cgc tcc   867
Ser Thr Glu Asn Met Thr Leu Asn Trp Tyr Trp Gly Asn Asp Arg Ser
                275                 280                 285

atg ctt atc acc aac tgc cta ttt cgc atg ggt ggc gct gcc atc atc   915
Met Leu Ile Thr Asn Cys Leu Phe Arg Met Gly Gly Ala Ala Ile Ile
            290                 295                 300

ctc tca aac cgc tgg cgt gat cgt cgc cga tcc aag tac caa ctc ctt   963
Leu Ser Asn Arg Trp Arg Asp Arg Arg Arg Ser Lys Tyr Gln Leu Leu
        305                 310                 315

cac aca gta cgc acc cac aag ggc gct gac gac aag tcc tat aga tgc   1011
His Thr Val Arg Thr His Lys Gly Ala Asp Asp Lys Ser Tyr Arg Cys
    320                 325                 330

gtc tta caa caa gaa gat gaa aat aac aag gta ggt gtt gcc tta tcc   1059
Val Leu Gln Gln Glu Asp Glu Asn Asn Lys Val Gly Val Ala Leu Ser
335                 340                 345                 350

aag gat ctg atg gca gtt gcc ggt gaa gcc cta aag gcc aac atc acg   1107
Lys Asp Leu Met Ala Val Ala Gly Glu Ala Leu Lys Ala Asn Ile Thr
                355                 360                 365

acc ctt ggt ccc ctc gtg ctc ccc atg tca gaa caa ctc ctc ttc ttt   1155
Thr Leu Gly Pro Leu Val Leu Pro Met Ser Glu Gln Leu Leu Phe Phe
            370                 375                 380

gcc acc tta gtg gca cgt aag gtc ttc aag atg acg aac gtg aag cca   1203
Ala Thr Leu Val Ala Arg Lys Val Phe Lys Met Thr Asn Val Lys Pro
        385                 390                 395

tac atc cca gat ttc aag ttg gca gcg aag cac ttc tgc atc cat gca   1251
Tyr Ile Pro Asp Phe Lys Leu Ala Ala Lys His Phe Cys Ile His Ala
    400                 405                 410

gga ggc aaa gca gtg ttg gat gag ctc gag acg aac ttg gag ttg acg   1299
Gly Gly Lys Ala Val Leu Asp Glu Leu Glu Thr Asn Leu Glu Leu Thr
415                 420                 425                 430

cca tgg cac ctt gaa ccc tcg agg atg aca ctg tat agg ttt ggg aac   1347
Pro Trp His Leu Glu Pro Ser Arg Met Thr Leu Tyr Arg Phe Gly Asn
                435                 440                 445

aca tcg agt agc tca tta tgg tac gag ttg gca tac gct gaa gca aaa   1395
Thr Ser Ser Ser Ser Leu Trp Tyr Glu Leu Ala Tyr Ala Glu Ala Lys
            450                 455                 460
```

```
ggg agg atc cgt aag ggt gat cga act tgg atg att gga ttt ggt tca   1443
Gly Arg Ile Arg Lys Gly Asp Arg Thr Trp Met Ile Gly Phe Gly Ser
        465                 470                 475

ggt ttc aag tgt aac agt gtt gtg tgg agg gct ttg agg agt gtc aat   1491
Gly Phe Lys Cys Asn Ser Val Val Trp Arg Ala Leu Arg Ser Val Asn
    480                 485                 490

ccg gct aga gag aag aat cct tgg atg gat gaa att gag aat ttc cct   1539
Pro Ala Arg Glu Lys Asn Pro Trp Met Asp Glu Ile Glu Asn Phe Pro
495                 500                 505                 510

gtc cat gtg cct aaa atc gca cct atc gct tcg tagaactgct aggatgtgat 1592
Val His Val Pro Lys Ile Ala Pro Ile Ala Ser
                515                 520

tagtaatgaa aaatgtgtat tatgttagtg atgtagaaaa agaaacttta gttgatgggt 1652

gagaacatgt ctcattgaga ataacgtgtg catcgttgtg ttgaatttga atttgagtat 1712

tggtgaaatt ctgttagaat tgacgcatga gtcatatata tacaaattta agtaagattt 1772

tacgctttct t                                                      1783
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<210> 6
<211> 521
<212> PRT
<213> Simmondsia chinensis

<400> 6

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Met Lys Ala Lys Thr Ile Thr Asn Pro Glu Ile Gln Val Ser Thr Thr
  1               5                  10                  15

Met Thr Thr Thr Thr Thr Thr Ala Thr Leu Pro Asn Phe Lys Ser Ser
             20                  25                  30

Ile Asn Leu His His Val Lys Leu Gly Tyr His Tyr Leu Ile Ser Asn
         35                  40                  45

Ala Leu Phe Leu Val Phe Ile Pro Leu Leu Gly Leu Ala Ser Ala His
     50                  55                  60

Leu Ser Ser Phe Ser Ala His Asp Leu Ser Leu Leu Phe Asp Leu Leu
 65                  70                  75                  80

Arg Arg Asn Leu Leu Pro Val Val Val Cys Ser Phe Leu Phe Val Leu
                 85                  90                  95

Leu Ala Thr Leu His Phe Leu Thr Arg Pro Arg Asn Val Tyr Leu Val
            100                 105                 110

Asp Phe Ala Cys Tyr Lys Pro His Pro Asn Leu Ile Thr Ser His Glu
        115                 120                 125
```

```
Met Phe Met Asp Arg Thr Ser Arg Ala Gly Ser Phe Ser Lys Glu Asn
    130                 135                 140

Ile Glu Phe Gln Arg Lys Ile Leu Glu Arg Ala Gly Met Gly Arg Glu
145                 150                 155                 160

Thr Tyr Val Pro Glu Ser Val Thr Lys Val Pro Pro Glu Pro Ser Ile
                165                 170                 175

Ala Ala Ala Arg Ala Glu Ala Glu Glu Val Met Tyr Gly Ala Ile Asp
            180                 185                 190

Glu Val Leu Glu Lys Thr Gly Val Lys Pro Lys Gln Ile Gly Ile Leu
        195                 200                 205

Val Val Asn Cys Ser Leu Phe Asn Pro Thr Pro Ser Leu Ser Ser Met
    210                 215                 220

Ile Val Asn His Tyr Lys Leu Arg Gly Asn Ile Leu Ser Tyr Asn Leu
225                 230                 235                 240

Gly Gly Met Gly Cys Ser Ala Gly Leu Ile Ser Ile Asp Leu Ala Lys
                245                 250                 255

Asp Leu Leu Gln Val Tyr Arg Asn Thr Tyr Val Leu Val Val Ser Thr
            260                 265                 270

Glu Asn Met Thr Leu Asn Trp Tyr Trp Gly Asn Asp Arg Ser Met Leu
        275                 280                 285

Ile Thr Asn Cys Leu Phe Arg Met Gly Gly Ala Ala Ile Ile Leu Ser
    290                 295                 300

Asn Arg Trp Arg Asp Arg Arg Arg Ser Lys Tyr Gln Leu Leu His Thr
305                 310                 315                 320

Val Arg Thr His Lys Gly Ala Asp Asp Lys Ser Tyr Arg Cys Val Leu
                325                 330                 335

Gln Gln Glu Asp Glu Asn Asn Lys Val Gly Val Ala Leu Ser Lys Asp
            340                 345                 350

Leu Met Ala Val Ala Gly Glu Ala Leu Lys Ala Asn Ile Thr Thr Leu
        355                 360                 365

Gly Pro Leu Val Leu Pro Met Ser Glu Gln Leu Leu Phe Phe Ala Thr
    370                 375                 380

Leu Val Ala Arg Lys Val Phe Lys Met Thr Asn Val Lys Pro Tyr Ile
385                 390                 395                 400

Pro Asp Phe Lys Leu Ala Ala Lys His Phe Cys Ile His Ala Gly Gly
                405                 410                 415
```

```
Lys Ala Val Leu Asp Glu Leu Glu Thr Asn Leu Glu Leu Thr Pro Trp
            420                 425                 430

His Leu Glu Pro Ser Arg Met Thr Leu Tyr Arg Phe Gly Asn Thr Ser
        435                 440                 445

Ser Ser Ser Leu Trp Tyr Glu Leu Ala Tyr Ala Glu Ala Lys Gly Arg
    450                 455                 460

Ile Arg Lys Gly Asp Arg Thr Trp Met Ile Gly Phe Gly Ser Gly Phe
465                 470                 475                 480

Lys Cys Asn Ser Val Val Trp Arg Ala Leu Arg Ser Val Asn Pro Ala
                485                 490                 495

Arg Glu Lys Asn Pro Trp Met Asp Glu Ile Glu Asn Phe Pro Val His
            500                 505                 510

Val Pro Lys Ile Ala Pro Ile Ala Ser
        515                 520
```

<210> 7
<211> 1647
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Oleosin
expression cassette

<400> 7

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ggcgcgccgg tacctctaga cctggcgatt caacgtggtc ggatcatgac gcttccagaa 60
aacatcgagc aagctctcaa agctgacctc tttcggatcg tactgaaccc gaacaatctc 120
gttatgtccc gtcgtctccg aacagacatc ctcgtagctc ggattatcga cgaatccatg 180
gctataccca acctccgtct tcgtcacgcc tggaaccctc tggtacgcca attccgctcc 240
ccagaagcaa ccggcgccga attgcgcgaa ttgctgacct ggagacggaa catcgtcgtc 300
gggtccttgc gcgattgcgg cggaagccgg gtcgggttgg ggacgagacc cgaatccgag 360
cctggtgaag aggttgttca tcggagattt atagacggag atggatcgag cggttttggg 420
gaaaggggaa gtgggtttgg ctcttttgga tagagagagt gcagctttgg agagagactg 480
gagaggttta gagagagacg cggcggatat taccggagga gaggcgacga gagatagcat 540
tatcgaaggg gagggagaaa gagtgacgtg gagaaataag aaaccgttaa gagtcggata 600
tttatcatat taaaagccca atgggcctga acccatttaa acaagacaga taaatgggcc 660
gtgtgttaag ttaacagagt gttaacgttc ggtttcaaat gccaacgcca taggaacaaa 720
acaaacgtgt cctcaagtaa acccctgccg tttacacctc aatggctgca tggtgaagcc 780
attaacacgt ggcgtaggat gcatgacgac gccattgaca cctgactctc ttcccttctc 840
ttcatatatc tctaatcaat tcaactactc attgtcatag ctattcggaa aatacataca 900
catccttttc tcttcgatct ctctcaattc acaagaagca aagtcgacgg atccctgcag 960
taaattacgc catgactatt ttcatagtcc aataaggctg atgtcgggag tccagtttat 1020
gagcaataag gtgtttagaa tttgatcaat gtttataata aaaggggaa gatgatatca 1080
cagtcttttg ttctttttgg cttttgttaa atttgtgtgt ttctatttgt aaacctcctg 1140
tatatgttgt acttctttcc ctttttaagt ggtatcgtct atatggtaaa acgttatgtt 1200
```

```
tggtctttcc ttttctctgt ttaggataaa aagactgcat gttttatctt tagttatatt 1260
atgttgagta aatgaacttt catagatctg gttccgtaga gtagactagc agccgagctg 1320
agctgaactg aacagctggc aatgtgaaca ctggatgcaa gatcagatgt gaagatctct 1380
aatatggtgg tgggattgaa catatcgtgt ctatattttt gttggcatta agctcttaac 1440
atagatataa ctgatgcagt cattggttca tacacatata tagtaaggaa ttacaatggc 1500
aacccaaact tcaaaaacag taggccacct gaattgcctt atcgaataag agtttgtttc 1560
cccccacttc atgggatgta atacatggga tttgggagtt tgaatgaacg ttgagacatg 1620
gcagaacctc tagaggtacc ggcgcgc                                      1647


<210> 8
<211> 1810
<212> DNA
<213> Brassica sp.

<220>
<221> CDS
<222> (4)..(1647)

<400> 8
gaa atg agt agg tct agc gaa caa gat cta ctc tct acc gag att gtt   48
    Met Ser Arg Ser Ser Glu Gln Asp Leu Leu Ser Thr Glu Ile Val
      1               5                  10                  15

aac cgt ggg atc gaa cct tcc ggt cca aac gcc ggt tca cca acg ttc   96
Asn Arg Gly Ile Glu Pro Ser Gly Pro Asn Ala Gly Ser Pro Thr Phe
                 20                  25                  30

tcg gtc aga gtc cgg aga cgt tta ccg gat ttt ctt caa tcc gta aac   144
Ser Val Arg Val Arg Arg Arg Leu Pro Asp Phe Leu Gln Ser Val Asn
             35                  40                  45

ttg aag tac gtg aaa ctt ggt tat cac tac ctc ata aac cat gcg gtt   192
Leu Lys Tyr Val Lys Leu Gly Tyr His Tyr Leu Ile Asn His Ala Val
         50                  55                  60

tac ttg gcg acg ata ccg gtt ctt gtg ctt gtg ttt agt gcc gaa gtt   240
Tyr Leu Ala Thr Ile Pro Val Leu Val Leu Val Phe Ser Ala Glu Val
     65                  70                  75

ggg agt tta agc gga gaa gag att tgg aag aag ctt tgg gac tat gat   288
Gly Ser Leu Ser Gly Glu Glu Ile Trp Lys Lys Leu Trp Asp Tyr Asp
 80                  85                  90                  95

atc gca acc gtc atc gga ttc ttc ggt gtc ttt gtc ttg acc gtt tgc   336
Ile Ala Thr Val Ile Gly Phe Phe Gly Val Phe Val Leu Thr Val Cys
                100                 105                 110

gtc tac ttc atg tct cgt cca cga tct gtt tat ctc att gac ttc gct   384
Val Tyr Phe Met Ser Arg Pro Arg Ser Val Tyr Leu Ile Asp Phe Ala
            115                 120                 125
```

```
tgt ttc aag cct tcc gat gaa ctt aag gtg aca aga gaa gag ttc ata   432
Cys Phe Lys Pro Ser Asp Glu Leu Lys Val Thr Arg Glu Glu Phe Ile
        130                 135                 140

gat cta gct aga aaa tca ggc aag ttc gac gaa gag atc ctc gga ttc   480
Asp Leu Ala Arg Lys Ser Gly Lys Phe Asp Glu Glu Ile Leu Gly Phe
    145                 150                 155

aag aag agg atc ctt caa gcc tca gga ata ggc gat gaa acg tac gtc   528
Lys Lys Arg Ile Leu Gln Ala Ser Gly Ile Gly Asp Glu Thr Tyr Val
160                 165                 170                 175

cca aga tca atc tct tcg tcg gaa aac aca aca acg atg aaa gaa ggt   576
Pro Arg Ser Ile Ser Ser Ser Glu Asn Thr Thr Thr Met Lys Glu Gly
                180                 185                 190

cgt gaa gaa gcc tcg atg atg ata ttc ggc gca ctc gac gaa ctc ttc   624
Arg Glu Glu Ala Ser Met Met Ile Phe Gly Ala Leu Asp Glu Leu Phe
            195                 200                 205

gag aag aca cgt gtc aaa ccg aaa gac gta ggt gtc ctc gtg gtt aac   672
Glu Lys Thr Arg Val Lys Pro Lys Asp Val Gly Val Leu Val Val Asn
        210                 215                 220

tgc agt atc ttt aac ccg act ccg tca ctc tcc gcg atg gtg att aac   720
Cys Ser Ile Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Val Ile Asn
    225                 230                 235

cac tac aag atg aga ggg aac ata ctt agc tac aac cta gga ggg atg   768
His Tyr Lys Met Arg Gly Asn Ile Leu Ser Tyr Asn Leu Gly Gly Met
240                 245                 250                 255

ggt tgc tca gca gga atc ata gcc gtt gat ctt gct cgt gac atg ctt   816
Gly Cys Ser Ala Gly Ile Ile Ala Val Asp Leu Ala Arg Asp Met Leu
                260                 265                 270

cag tct aac ccg aat agt tac gcg gtg gtt gtg agt acc gag atg gtt   864
Gln Ser Asn Pro Asn Ser Tyr Ala Val Val Val Ser Thr Glu Met Val
            275                 280                 285

ggg tat aat tgg tac gtg gga cgt gac aag tca atg gtt ata cct aac   912
Gly Tyr Asn Trp Tyr Val Gly Arg Asp Lys Ser Met Val Ile Pro Asn
        290                 295                 300

tgc ttc ttt agg atg ggt tgc tcc gcc gtt atg ctg tct aac cgc cgc   960
Cys Phe Phe Arg Met Gly Cys Ser Ala Val Met Leu Ser Asn Arg Arg
    305                 310                 315

cgt gac ttc cgc cat gct aag tac cgc ctt gag cac att gtc cgg act  1008
Arg Asp Phe Arg His Ala Lys Tyr Arg Leu Glu His Ile Val Arg Thr
320                 325                 330                 335
```

```
cac aag gct gcc gac gac cgt agc ttc agg agt gtg tac cag gaa gaa   1056
His Lys Ala Ala Asp Asp Arg Ser Phe Arg Ser Val Tyr Gln Glu Glu
                340                 345                 350

gat gaa caa gga ttc aag gga tta aaa ata agc aga gac cta atg gaa   1104
Asp Glu Gln Gly Phe Lys Gly Leu Lys Ile Ser Arg Asp Leu Met Glu
            355                 360                 365

gtt gga ggt gaa gct ctc aag acc aac atc acc acc tta ggc cct ctc   1152
Val Gly Gly Glu Ala Leu Lys Thr Asn Ile Thr Thr Leu Gly Pro Leu
        370                 375                 380

gtc ctt cct ttc tcc gag cag ctt ctc ttc ttt gcc gct ttg atc cgt   1200
Val Leu Pro Phe Ser Glu Gln Leu Leu Phe Phe Ala Ala Leu Ile Arg
    385                 390                 395

aga act ttc tca ccc gcc gcc aaa act acc acc acc tcc tcc tca gcc   1248
Arg Thr Phe Ser Pro Ala Ala Lys Thr Thr Thr Thr Ser Ser Ser Ala
400                 405                 410                 415

act gcg aaa atc aac gga gcc aag tcg tca tcc tcc tct gat cta tcc   1296
Thr Ala Lys Ile Asn Gly Ala Lys Ser Ser Ser Ser Ser Asp Leu Ser
                420                 425                 430

aag ccg tac atc ccg gac tac aag ctt gcc ttc gag cat ttc tgc ttc   1344
Lys Pro Tyr Ile Pro Asp Tyr Lys Leu Ala Phe Glu His Phe Cys Phe
            435                 440                 445

cac gcg gca agc aaa gcg gtg ctt gag gag ctt cag aag aat cta ggc   1392
His Ala Ala Ser Lys Ala Val Leu Glu Glu Leu Gln Lys Asn Leu Gly
        450                 455                 460

ttg agt gat gag aac atg gag gct tct aag atg act tta cac agg ttt   1440
Leu Ser Asp Glu Asn Met Glu Ala Ser Lys Met Thr Leu His Arg Phe
    465                 470                 475

gga aac act tcc agc agt gga atc tgg tac gag ctt gct tac atg gag   1488
Gly Asn Thr Ser Ser Ser Gly Ile Trp Tyr Glu Leu Ala Tyr Met Glu
480                 485                 490                 495

gcc aag gag agt gtt cgt aga ggc gat agg gtt tgg cag att gct ttt   1536
Ala Lys Glu Ser Val Arg Arg Gly Asp Arg Val Trp Gln Ile Ala Phe
                500                 505                 510

ggg tca ggt ttt aag tgt aac agt gtg gtt tgg aag gca atg agg aag   1584
Gly Ser Gly Phe Lys Cys Asn Ser Val Val Trp Lys Ala Met Arg Lys
            515                 520                 525

gtg aag aag ccg gca agg aac aat cct tgg gtt gat tgc att aac cgt   1632
Val Lys Lys Pro Ala Arg Asn Asn Pro Trp Val Asp Cys Ile Asn Arg
        530                 535                 540
```

tac cct gtc gct ctc tgatcattta tttttaaaat tattatttct tcttaattaa 1687
Tyr Pro Val Ala Leu
545

atcatctatg atctctcttc cttgttgttg gatgatagac gtttgtttgc tggtcattcg 1747

tatcttaaga cttctataag aatggatggt tcaagtccaa aaaaaaaaaa aaaaaaaaaa 1807

aaa 1810

<210> 9
<211> 548
<212> PRT
<213> Brassica sp.

<400> 9
Met Ser Arg Ser Ser Glu Gln Asp Leu Leu Ser Thr Glu Ile Val Asn
1 5 10 15

Arg Gly Ile Glu Pro Ser Gly Pro Asn Ala Gly Ser Pro Thr Phe Ser
20 25 30

Val Arg Val Arg Arg Arg Leu Pro Asp Phe Leu Gln Ser Val Asn Leu
35 40 45

Lys Tyr Val Lys Leu Gly Tyr His Tyr Leu Ile Asn His Ala Val Tyr
50 55 60

Leu Ala Thr Ile Pro Val Leu Val Leu Val Phe Ser Ala Glu Val Gly
65 70 75 80

Ser Leu Ser Gly Glu Glu Ile Trp Lys Lys Leu Trp Asp Tyr Asp Ile
85 90 95

Ala Thr Val Ile Gly Phe Phe Gly Val Phe Val Leu Thr Val Cys Val
100 105 110

Tyr Phe Met Ser Arg Pro Arg Ser Val Tyr Leu Ile Asp Phe Ala Cys
115 120 125

Phe Lys Pro Ser Asp Glu Leu Lys Val Thr Arg Glu Glu Phe Ile Asp
130 135 140

Leu Ala Arg Lys Ser Gly Lys Phe Asp Glu Glu Ile Leu Gly Phe Lys
145 150 155 160

Lys Arg Ile Leu Gln Ala Ser Gly Ile Gly Asp Glu Thr Tyr Val Pro
165 170 175

Arg Ser Ile Ser Ser Ser Glu Asn Thr Thr Thr Met Lys Glu Gly Arg
180 185 190

```
Glu Glu Ala Ser Met Met Ile Phe Gly Ala Leu Asp Glu Leu Phe Glu
        195                 200                 205

Lys Thr Arg Val Lys Pro Lys Asp Val Gly Val Leu Val Val Asn Cys
    210                 215                 220

Ser Ile Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Val Ile Asn His
225                 230                 235                 240

Tyr Lys Met Arg Gly Asn Ile Leu Ser Tyr Asn Leu Gly Gly Met Gly
                245                 250                 255

Cys Ser Ala Gly Ile Ile Ala Val Asp Leu Ala Arg Asp Met Leu Gln
            260                 265                 270

Ser Asn Pro Asn Ser Tyr Ala Val Val Val Ser Thr Glu Met Val Gly
        275                 280                 285

Tyr Asn Trp Tyr Val Gly Arg Asp Lys Ser Met Val Ile Pro Asn Cys
    290                 295                 300

Phe Phe Arg Met Gly Cys Ser Ala Val Met Leu Ser Asn Arg Arg Arg
305                 310                 315                 320

Asp Phe Arg His Ala Lys Tyr Arg Leu Glu His Ile Val Arg Thr His
                325                 330                 335

Lys Ala Ala Asp Asp Arg Ser Phe Arg Ser Val Tyr Gln Glu Glu Asp
            340                 345                 350

Glu Gln Gly Phe Lys Gly Leu Lys Ile Ser Arg Asp Leu Met Glu Val
        355                 360                 365

Gly Gly Glu Ala Leu Lys Thr Asn Ile Thr Thr Leu Gly Pro Leu Val
    370                 375                 380

Leu Pro Phe Ser Glu Gln Leu Leu Phe Phe Ala Ala Leu Ile Arg Arg
385                 390                 395                 400

Thr Phe Ser Pro Ala Ala Lys Thr Thr Thr Thr Ser Ser Ser Ala Thr
                405                 410                 415

Ala Lys Ile Asn Gly Ala Lys Ser Ser Ser Ser Ser Asp Leu Ser Lys
            420                 425                 430

Pro Tyr Ile Pro Asp Tyr Lys Leu Ala Phe Glu His Phe Cys Phe His
        435                 440                 445

Ala Ala Ser Lys Ala Val Leu Glu Glu Leu Gln Lys Asn Leu Gly Leu
    450                 455                 460

Ser Asp Glu Asn Met Glu Ala Ser Lys Met Thr Leu His Arg Phe Gly
465                 470                 475                 480
```

```
Asn Thr Ser Ser Ser Gly Ile Trp Tyr Glu Leu Ala Tyr Met Glu Ala
                485                 490                 495

Lys Glu Ser Val Arg Arg Gly Asp Arg Val Trp Gln Ile Ala Phe Gly
            500                 505                 510

Ser Gly Phe Lys Cys Asn Ser Val Val Trp Lys Ala Met Arg Lys Val
        515                 520                 525

Lys Lys Pro Ala Arg Asn Asn Pro Trp Val Asp Cys Ile Asn Arg Tyr
    530                 535                 540

Pro Val Ala Leu
545
```

<210> 10
<211> 1442
<212> DNA
<213> Brassica sp.

<220>
<221> CDS
<222> (10)..(1434)

<400> 10

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gtcgacaaa atg acg tcc att aac gta aag ctc ctt tac cat tac gtc ata 51
          Met Thr Ser Ile Asn Val Lys Leu Leu Tyr His Tyr Val Ile
            1               5                  10

acc aac ctt ttc aac ctt tgt ttc ttt cca tta acg gcg atc gtc gcc   99
Thr Asn Leu Phe Asn Leu Cys Phe Phe Pro Leu Thr Ala Ile Val Ala
 15                  20                  25                  30

gga aaa gcc tat cgg ctt acc ata gac gat ctt cac cac tta tac tat   147
Gly Lys Ala Tyr Arg Leu Thr Ile Asp Asp Leu His His Leu Tyr Tyr
                 35                  40                  45

tcc tat ctc caa cac aac ctc ata acc att gct cca ctc ttt gcc ttc   195
Ser Tyr Leu Gln His Asn Leu Ile Thr Ile Ala Pro Leu Phe Ala Phe
             50                  55                  60

acc gtt ttc ggt tcg gtt ctc tac atc gca acc cgg ccc aaa ccg gtt   243
Thr Val Phe Gly Ser Val Leu Tyr Ile Ala Thr Arg Pro Lys Pro Val
         65                  70                  75

tac ctc gtt gag tac tca tgc tac ctt cca cca acg cat tgt aga tca   291
Tyr Leu Val Glu Tyr Ser Cys Tyr Leu Pro Pro Thr His Cys Arg Ser
     80                  85                  90

agt atc tcc aag gtc atg gat atc ttt tac caa gta aga aaa gct gat   339
Ser Ile Ser Lys Val Met Asp Ile Phe Tyr Gln Val Arg Lys Ala Asp
 95                  100                 105                 110
```

```
cct tct cgg aac ggc acg tgc gat gac tcg tcc tgg ctt gac ttc ttg   387
Pro Ser Arg Asn Gly Thr Cys Asp Asp Ser Ser Trp Leu Asp Phe Leu
                115                 120                 125

agg aag att caa gaa cgt tca ggt cta ggc gat gaa acc cac ggg ccc   435
Arg Lys Ile Gln Glu Arg Ser Gly Leu Gly Asp Glu Thr His Gly Pro
            130                 135                 140

gag ggg ctg ctt cag gtc cct ccc cgg aag act ttt gcg gcg gcg cgt   483
Glu Gly Leu Leu Gln Val Pro Pro Arg Lys Thr Phe Ala Ala Ala Arg
        145                 150                 155

gaa gag acg gag caa gtt atc att ggt gcg cta gaa aat cta ttc aag   531
Glu Glu Thr Glu Gln Val Ile Ile Gly Ala Leu Glu Asn Leu Phe Lys
    160                 165                 170

aac acc aat gtt aac cct aaa gat ata ggt ata ctt gtg gtg aac tca   579
Asn Thr Asn Val Asn Pro Lys Asp Ile Gly Ile Leu Val Val Asn Ser
175                 180                 185                 190

agc atg ttt aat cca act cct tcg ctc tcc gcg atg gtc gtt aac act   627
Ser Met Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Val Val Asn Thr
                195                 200                 205

ttc aag ctc cga agc aac gta aga agc ttt aac ctt ggt ggc atg ggt   675
Phe Lys Leu Arg Ser Asn Val Arg Ser Phe Asn Leu Gly Gly Met Gly
            210                 215                 220

tgt agt gcc ggc gtt ata gcc att gat cta gca aag gac ttg ttg cat   723
Cys Ser Ala Gly Val Ile Ala Ile Asp Leu Ala Lys Asp Leu Leu His
        225                 230                 235

gtc cat aaa aat acg tat gct ctt gtg gtg agc aca gag aac atc act   771
Val His Lys Asn Thr Tyr Ala Leu Val Val Ser Thr Glu Asn Ile Thr
    240                 245                 250

tat aac att tac gct ggt gat aat agg tcc atg atg gtt tca aat tgc   819
Tyr Asn Ile Tyr Ala Gly Asp Asn Arg Ser Met Met Val Ser Asn Cys
255                 260                 265                 270

ttg ttc cgt gtt ggt ggg gcc gct att ttg ctc tcc aac aag cct aga   867
Leu Phe Arg Val Gly Gly Ala Ala Ile Leu Leu Ser Asn Lys Pro Arg
                275                 280                 285

gat cgt aga cgg tcc aag tac gag cta gtt cac acg gtt cga acg cat   915
Asp Arg Arg Arg Ser Lys Tyr Glu Leu Val His Thr Val Arg Thr His
            290                 295                 300

acc gga gct gac gac aag tct ttt cgt tgc gtg caa caa gga gac gtt   963
Thr Gly Ala Asp Asp Lys Ser Phe Arg Cys Val Gln Gln Gly Asp Val
        305                 310                 315
```

```
gag aac ggc aaa acc gga gtg agt ttg tcc aag gac ata acc gat gtt   1011
Glu Asn Gly Lys Thr Gly Val Ser Leu Ser Lys Asp Ile Thr Asp Val
    320                 325                 330

gct ggt cga acg gtt aag aaa aac ata gca acg ctg ggt ccg ttg att   1059
Ala Gly Arg Thr Val Lys Lys Asn Ile Ala Thr Leu Gly Pro Leu Ile
335                 340                 345                 350

ctt ccg tta agc gag aaa ctt ctt ttt ttc gtt acc ttc atg ggc aag   1107
Leu Pro Leu Ser Glu Lys Leu Leu Phe Phe Val Thr Phe Met Gly Lys
                355                 360                 365

aaa ctt ttc aaa gac aaa atc aaa cat tat tac gtc ccg gac ttc aag   1155
Lys Leu Phe Lys Asp Lys Ile Lys His Tyr Tyr Val Pro Asp Phe Lys
            370                 375                 380

ctt gct atc gac cat ttt tgt ata cat gcc gga ggc aaa gcc gtg att   1203
Leu Ala Ile Asp His Phe Cys Ile His Ala Gly Gly Lys Ala Val Ile
        385                 390                 395

gat gtg cta gag aag aac cta ggc cta gca ccg atc gat gta gag gca   1251
Asp Val Leu Glu Lys Asn Leu Gly Leu Ala Pro Ile Asp Val Glu Ala
    400                 405                 410

tca aga tca acg tta cat aga ttt gga aac act tca tct agc tca ata   1299
Ser Arg Ser Thr Leu His Arg Phe Gly Asn Thr Ser Ser Ser Ser Ile
415                 420                 425                 430

tgg tat gag ttg gca tac ata gaa gca aaa gga agg atg aag aaa ggt   1347
Trp Tyr Glu Leu Ala Tyr Ile Glu Ala Lys Gly Arg Met Lys Lys Gly
                435                 440                 445

aat aaa gtt tgg cag att gct tta ggg tca ggc ttt aag tgt aac agt   1395
Asn Lys Val Trp Gln Ile Ala Leu Gly Ser Gly Phe Lys Cys Asn Ser
            450                 455                 460

gca gtt tgg gtg gct cta aac aat gtc aaa gct tcc aaa taggatcc      1442
Ala Val Trp Val Ala Leu Asn Asn Val Lys Ala Ser Lys
        465                 470                 475
```

<210> 11
<211> 475
<212> PRT
<213> Brassica sp.

<400> 11

```
Met Thr Ser Ile Asn Val Lys Leu Leu Tyr His Tyr Val Ile Thr Asn
  1               5                  10                  15

Leu Phe Asn Leu Cys Phe Phe Pro Leu Thr Ala Ile Val Ala Gly Lys
             20                  25                  30
```

```
Ala Tyr Arg Leu Thr Ile Asp Asp Leu His His Leu Tyr Tyr Ser Tyr
         35                  40                  45

Leu Gln His Asn Leu Ile Thr Ile Ala Pro Leu Phe Ala Phe Thr Val
     50                  55                  60

Phe Gly Ser Val Leu Tyr Ile Ala Thr Arg Pro Lys Pro Val Tyr Leu
 65                  70                  75                  80

Val Glu Tyr Ser Cys Tyr Leu Pro Pro Thr His Cys Arg Ser Ser Ile
                 85                  90                  95

Ser Lys Val Met Asp Ile Phe Tyr Gln Val Arg Lys Ala Asp Pro Ser
            100                 105                 110

Arg Asn Gly Thr Cys Asp Asp Ser Ser Trp Leu Asp Phe Leu Arg Lys
        115                 120                 125

Ile Gln Glu Arg Ser Gly Leu Gly Asp Glu Thr His Gly Pro Glu Gly
    130                 135                 140

Leu Leu Gln Val Pro Pro Arg Lys Thr Phe Ala Ala Ala Arg Glu Glu
145                 150                 155                 160

Thr Glu Gln Val Ile Ile Gly Ala Leu Glu Asn Leu Phe Lys Asn Thr
                165                 170                 175

Asn Val Asn Pro Lys Asp Ile Gly Ile Leu Val Val Asn Ser Ser Met
            180                 185                 190

Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Val Val Asn Thr Phe Lys
        195                 200                 205

Leu Arg Ser Asn Val Arg Ser Phe Asn Leu Gly Gly Met Gly Cys Ser
    210                 215                 220

Ala Gly Val Ile Ala Ile Asp Leu Ala Lys Asp Leu Leu His Val His
225                 230                 235                 240

Lys Asn Thr Tyr Ala Leu Val Val Ser Thr Glu Asn Ile Thr Tyr Asn
                245                 250                 255

Ile Tyr Ala Gly Asp Asn Arg Ser Met Met Val Ser Asn Cys Leu Phe
            260                 265                 270

Arg Val Gly Gly Ala Ala Ile Leu Leu Ser Asn Lys Pro Arg Asp Arg
        275                 280                 285

Arg Arg Ser Lys Tyr Glu Leu Val His Thr Val Arg Thr His Thr Gly
    290                 295                 300

Ala Asp Asp Lys Ser Phe Arg Cys Val Gln Gln Gly Asp Val Glu Asn
305                 310                 315                 320
```

```
Gly Lys Thr Gly Val Ser Leu Ser Lys Asp Ile Thr Asp Val Ala Gly
                325                 330                 335

Arg Thr Val Lys Lys Asn Ile Ala Thr Leu Gly Pro Leu Ile Leu Pro
            340                 345                 350

Leu Ser Glu Lys Leu Leu Phe Phe Val Thr Phe Met Gly Lys Lys Leu
        355                 360                 365

Phe Lys Asp Lys Ile Lys His Tyr Tyr Val Pro Asp Phe Lys Leu Ala
    370                 375                 380

Ile Asp His Phe Cys Ile His Ala Gly Gly Lys Ala Val Ile Asp Val
385                 390                 395                 400

Leu Glu Lys Asn Leu Gly Leu Ala Pro Ile Asp Val Glu Ala Ser Arg
                405                 410                 415

Ser Thr Leu His Arg Phe Gly Asn Thr Ser Ser Ser Ser Ile Trp Tyr
            420                 425                 430

Glu Leu Ala Tyr Ile Glu Ala Lys Gly Arg Met Lys Lys Gly Asn Lys
        435                 440                 445

Val Trp Gln Ile Ala Leu Gly Ser Gly Phe Lys Cys Asn Ser Ala Val
    450                 455                 460

Trp Val Ala Leu Asn Asn Val Lys Ala Ser Lys
465                 470                 475
```

<210> 12
<211> 1442
<212> DNA
<213> Brassica sp.

<220>
<221> CDS
<222> (10)..(1434)

<400> 12

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gtcgacaaa atg acg tcc att aac gta aag ctc ctt tac cat tac gtc ata 51
          Met Thr Ser Ile Asn Val Lys Leu Leu Tyr His Tyr Val Ile
            1               5                  10

acc aac ctt ttc aac ctt tgc ttc ttt ccg tta acg gcg atc gtc gcc   99
Thr Asn Leu Phe Asn Leu Cys Phe Phe Pro Leu Thr Ala Ile Val Ala
 15                  20                  25                  30

gga aaa gcc tat cgg ctt acc ata gac gat ctt cac cac tta tac tat   147
Gly Lys Ala Tyr Arg Leu Thr Ile Asp Asp Leu His His Leu Tyr Tyr
                35                  40                  45
```

```
tcc tat ctc caa cac aac ctc ata acc atc gct cca ctc ttt gcc ttc   195
Ser Tyr Leu Gln His Asn Leu Ile Thr Ile Ala Pro Leu Phe Ala Phe
            50                  55                  60

acc gtt ttc ggt tcg gtt ctc tac atc gca acc cgg ccc aaa ccg gtt   243
Thr Val Phe Gly Ser Val Leu Tyr Ile Ala Thr Arg Pro Lys Pro Val
        65                  70                  75

tac ctc gtt gag tac tca tgc tac ctt cca cca acg cat tgt aga tca   291
Tyr Leu Val Glu Tyr Ser Cys Tyr Leu Pro Pro Thr His Cys Arg Ser
    80                  85                  90

agt atc tcc aag gtc atg gat atc ttt tat caa gta aga aaa gct gat   339
Ser Ile Ser Lys Val Met Asp Ile Phe Tyr Gln Val Arg Lys Ala Asp
95                  100                 105                 110

cct tct cgg aac ggc acg tgc gat gac tcg tcg tgg ctt gac ttc ttg   387
Pro Ser Arg Asn Gly Thr Cys Asp Asp Ser Ser Trp Leu Asp Phe Leu
                115                 120                 125

agg aag att caa gaa cgt tca ggt cta ggc gat gaa act cac ggg ccc   435
Arg Lys Ile Gln Glu Arg Ser Gly Leu Gly Asp Glu Thr His Gly Pro
            130                 135                 140

gag ggg ctg ctt cag gtc cct ccc cgg aag act ttt gcg gcg gcg cgt   483
Glu Gly Leu Leu Gln Val Pro Pro Arg Lys Thr Phe Ala Ala Ala Arg
        145                 150                 155

gaa gag acg gag caa gtt atc att ggt gcg cta gaa aat cta ttc aag   531
Glu Glu Thr Glu Gln Val Ile Ile Gly Ala Leu Glu Asn Leu Phe Lys
    160                 165                 170

aac acc aac gtt aac cct aaa gat ata ggt ata ctt gtg gtg aac tca   579
Asn Thr Asn Val Asn Pro Lys Asp Ile Gly Ile Leu Val Val Asn Ser
175                 180                 185                 190

agc atg ttt aat cca act cca tcg ctc tcc gcg atg gtc gtt aac act   627
Ser Met Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Val Val Asn Thr
                195                 200                 205

ttc aag ctc cga agc aac gta aga agc ttt aac ctt ggt ggc atg ggt   675
Phe Lys Leu Arg Ser Asn Val Arg Ser Phe Asn Leu Gly Gly Met Gly
            210                 215                 220

tgt agt gcc ggc gtt ata gcc att gat cta gca aag gac ttg ttg cat   723
Cys Ser Ala Gly Val Ile Ala Ile Asp Leu Ala Lys Asp Leu Leu His
        225                 230                 235

gtc cat aaa aat acg tat gct ctt gtg gtg agc aca gag aac atc act   771
Val His Lys Asn Thr Tyr Ala Leu Val Val Ser Thr Glu Asn Ile Thr
    240                 245                 250
```

```
tat aac att tac gct ggt gat aat agg tcc atg atg gtt tca aat tgc   819
Tyr Asn Ile Tyr Ala Gly Asp Asn Arg Ser Met Met Val Ser Asn Cys
255                 260                 265                 270

ttg ttc cgt gtt ggt ggg gcc gct att ttg ctc tcc aac aag cct gga   867
Leu Phe Arg Val Gly Gly Ala Ala Ile Leu Leu Ser Asn Lys Pro Gly
                275                 280                 285

gat cgt aga cgg tcc aag tac gag cta gtt cac acg gtt cga acg cat   915
Asp Arg Arg Arg Ser Lys Tyr Glu Leu Val His Thr Val Arg Thr His
            290                 295                 300

acc gga gct gac gac aag tct ttt cgt tgc gtg caa caa gga gac gat   963
Thr Gly Ala Asp Asp Lys Ser Phe Arg Cys Val Gln Gln Gly Asp Asp
        305                 310                 315

gag aac ggc aaa atc gga gtg agt ttg tcc aag gac ata acc gat gtt   1011
Glu Asn Gly Lys Ile Gly Val Ser Leu Ser Lys Asp Ile Thr Asp Val
    320                 325                 330

gct ggt cga acg gtt aag aaa aac ata gca acg ttg ggt ccg ttg att   1059
Ala Gly Arg Thr Val Lys Lys Asn Ile Ala Thr Leu Gly Pro Leu Ile
335                 340                 345                 350

ctt ccg tta agc gag aaa ctt ctt ttt ttc gtt acc ttc atg ggc aag   1107
Leu Pro Leu Ser Glu Lys Leu Leu Phe Phe Val Thr Phe Met Gly Lys
                355                 360                 365

aaa ctt ttc aaa gat aaa atc aaa cat tac tac gtc ccg gat ttc aaa   1155
Lys Leu Phe Lys Asp Lys Ile Lys His Tyr Tyr Val Pro Asp Phe Lys
            370                 375                 380

ctt gct att gac cat ttt tgt ata cat gcc gga ggc aga gcc gtg att   1203
Leu Ala Ile Asp His Phe Cys Ile His Ala Gly Gly Arg Ala Val Ile
        385                 390                 395

gat gtg cta gag aag aac cta gcc cta gca ccg atc gat gta gag gca   1251
Asp Val Leu Glu Lys Asn Leu Ala Leu Ala Pro Ile Asp Val Glu Ala
    400                 405                 410

tca aga tca acg tta cat aga ttt gga aac act tca tct agc tca ata   1299
Ser Arg Ser Thr Leu His Arg Phe Gly Asn Thr Ser Ser Ser Ser Ile
415                 420                 425                 430

tgg tat gag ttg gca tac ata gaa gca aaa gga agg atg aag aaa ggt   1347
Trp Tyr Glu Leu Ala Tyr Ile Glu Ala Lys Gly Arg Met Lys Lys Gly
                435                 440                 445

aat aaa gtt tgg cag att gct tta ggg tca ggc ttt aag tgt aac agt   1395
Asn Lys Val Trp Gln Ile Ala Leu Gly Ser Gly Phe Lys Cys Asn Ser
            450                 455                 460
```

```
gca gtt tgg gtg gct cta aac aat gtc aaa gct tcc aaa taggatcc      1442
Ala Val Trp Val Ala Leu Asn Asn Val Lys Ala Ser Lys
        465                 470                 475


<210> 13
<211> 475
<212> PRT
<213> Brassica sp.

<400> 13
Met Thr Ser Ile Asn Val Lys Leu Leu Tyr His Tyr Val Ile Thr Asn
  1               5                  10                  15

Leu Phe Asn Leu Cys Phe Phe Pro Leu Thr Ala Ile Val Ala Gly Lys
             20                  25                  30

Ala Tyr Arg Leu Thr Ile Asp Asp Leu His His Leu Tyr Tyr Ser Tyr
         35                  40                  45

Leu Gln His Asn Leu Ile Thr Ile Ala Pro Leu Phe Ala Phe Thr Val
     50                  55                  60

Phe Gly Ser Val Leu Tyr Ile Ala Thr Arg Pro Lys Pro Val Tyr Leu
 65                  70                  75                  80

Val Glu Tyr Ser Cys Tyr Leu Pro Pro Thr His Cys Arg Ser Ser Ile
                 85                  90                  95

Ser Lys Val Met Asp Ile Phe Tyr Gln Val Arg Lys Ala Asp Pro Ser
            100                 105                 110

Arg Asn Gly Thr Cys Asp Asp Ser Ser Trp Leu Asp Phe Leu Arg Lys
        115                 120                 125

Ile Gln Glu Arg Ser Gly Leu Gly Asp Glu Thr His Gly Pro Glu Gly
    130                 135                 140

Leu Leu Gln Val Pro Pro Arg Lys Thr Phe Ala Ala Ala Arg Glu Glu
145                 150                 155                 160

Thr Glu Gln Val Ile Ile Gly Ala Leu Glu Asn Leu Phe Lys Asn Thr
                165                 170                 175

Asn Val Asn Pro Lys Asp Ile Gly Ile Leu Val Val Asn Ser Ser Met
            180                 185                 190

Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Val Val Asn Thr Phe Lys
        195                 200                 205

Leu Arg Ser Asn Val Arg Ser Phe Asn Leu Gly Gly Met Gly Cys Ser
    210                 215                 220
```

```
Ala Gly Val Ile Ala Ile Asp Leu Ala Lys Asp Leu Leu His Val His
225                 230                 235                 240

Lys Asn Thr Tyr Ala Leu Val Val Ser Thr Glu Asn Ile Thr Tyr Asn
                245                 250                 255

Ile Tyr Ala Gly Asp Asn Arg Ser Met Met Val Ser Asn Cys Leu Phe
            260                 265                 270

Arg Val Gly Gly Ala Ala Ile Leu Leu Ser Asn Lys Pro Gly Asp Arg
        275                 280                 285

Arg Arg Ser Lys Tyr Glu Leu Val His Thr Val Arg Thr His Thr Gly
    290                 295                 300

Ala Asp Asp Lys Ser Phe Arg Cys Val Gln Gln Gly Asp Asp Glu Asn
305                 310                 315                 320

Gly Lys Ile Gly Val Ser Leu Ser Lys Asp Ile Thr Asp Val Ala Gly
                325                 330                 335

Arg Thr Val Lys Lys Asn Ile Ala Thr Leu Gly Pro Leu Ile Leu Pro
            340                 345                 350

Leu Ser Glu Lys Leu Leu Phe Phe Val Thr Phe Met Gly Lys Lys Leu
        355                 360                 365

Phe Lys Asp Lys Ile Lys His Tyr Tyr Val Pro Asp Phe Lys Leu Ala
    370                 375                 380

Ile Asp His Phe Cys Ile His Ala Gly Gly Arg Ala Val Ile Asp Val
385                 390                 395                 400

Leu Glu Lys Asn Leu Ala Leu Ala Pro Ile Asp Val Glu Ala Ser Arg
                405                 410                 415

Ser Thr Leu His Arg Phe Gly Asn Thr Ser Ser Ser Ser Ile Trp Tyr
            420                 425                 430

Glu Leu Ala Tyr Ile Glu Ala Lys Gly Arg Met Lys Lys Gly Asn Lys
        435                 440                 445

Val Trp Gln Ile Ala Leu Gly Ser Gly Phe Lys Cys Asn Ser Ala Val
    450                 455                 460

Trp Val Ala Leu Asn Asn Val Lys Ala Ser Lys
465                 470                 475
```

<210> 14
<211> 623
<212> DNA
<213> Arabidopsis thaliana

<220>
<221> CDS
<222> (1)..(623)

<400> 14

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aag ctt aaa cta gtg tat cat tac cta atc tcc aac gct ctc tac atc   48
Lys Leu Lys Leu Val Tyr His Tyr Leu Ile Ser Asn Ala Leu Tyr Ile
  1               5                  10                  15

ctc ctc ctt cct ctc ctc gcc gca aca atc gct aac ctc tct tct ttc   96
Leu Leu Leu Pro Leu Leu Ala Ala Thr Ile Ala Asn Leu Ser Ser Phe
             20                  25                  30

acc atc aac gac ctc tct ctc ctc tac aac aca ctc cgt ttc cat ttc   144
Thr Ile Asn Asp Leu Ser Leu Leu Tyr Asn Thr Leu Arg Phe His Phe
         35                  40                  45

ctc tcc gcc aca ctc gcc acc gca ctc ttg atc tct ctc tcc acc gct   192
Leu Ser Ala Thr Leu Ala Thr Ala Leu Leu Ile Ser Leu Ser Thr Ala
     50                  55                  60

tac ttc acc acc cgt cct cgc cgt gtc ttc ctc ctc gac ttc tcg tgt   240
Tyr Phe Thr Thr Arg Pro Arg Arg Val Phe Leu Leu Asp Phe Ser Cys
 65                  70                  75                  80

tac aaa cca gac cct tca ctg atc tgc act cgt gaa aca ttc atg gac   288
Tyr Lys Pro Asp Pro Ser Leu Ile Cys Thr Arg Glu Thr Phe Met Asp
                 85                  90                  95

aga tct caa cgt gta ggc atc ttc aca gaa gac aac tta gct ttc caa   336
Arg Ser Gln Arg Val Gly Ile Phe Thr Glu Asp Asn Leu Ala Phe Gln
            100                 105                 110

caa aag atc ctc gaa aga tcc ggt cta ggt cag aaa act tac ttc cct   384
Gln Lys Ile Leu Glu Arg Ser Gly Leu Gly Gln Lys Thr Tyr Phe Pro
        115                 120                 125

gaa gct ctt ctt cgt gtt cct cct aat cct tgt atg gaa gaa gcg aga   432
Glu Ala Leu Leu Arg Val Pro Pro Asn Pro Cys Met Glu Glu Ala Arg
    130                 135                 140

aaa gag gca gaa aca gtt atg ttc gga gct att gac gcg gtt ctt gag   480
Lys Glu Ala Glu Thr Val Met Phe Gly Ala Ile Asp Ala Val Leu Glu
145                 150                 155                 160

aag acc ggt gtg aaa cct aaa gat att gga atc ctt gtg gtg aat tgt   528
Lys Thr Gly Val Lys Pro Lys Asp Ile Gly Ile Leu Val Val Asn Cys
                165                 170                 175

agc ttg ttt aat cca aca ccg tca ctt tct gct atg att gtg aat aag   576
Ser Leu Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Ile Val Asn Lys
            180                 185                 190
```

```
tat aag ctt aga ggc aac att ttg agc tat aat ttc ggc ggg atg gg   623
Tyr Lys Leu Arg Gly Asn Ile Leu Ser Tyr Asn Phe Gly Gly Met Gly
        195                 200                 205
```

<210> 15
<211> 208
<212> PRT
<213> Arabidopsis thaliana

<400> 15

```
Lys Leu Lys Leu Val Tyr His Tyr Leu Ile Ser Asn Ala Leu Tyr Ile
  1               5                  10                  15

Leu Leu Leu Pro Leu Leu Ala Ala Thr Ile Ala Asn Leu Ser Ser Phe
             20                  25                  30

Thr Ile Asn Asp Leu Ser Leu Leu Tyr Asn Thr Leu Arg Phe His Phe
         35                  40                  45

Leu Ser Ala Thr Leu Ala Thr Ala Leu Leu Ile Ser Leu Ser Thr Ala
     50                  55                  60

Tyr Phe Thr Thr Arg Pro Arg Arg Val Phe Leu Leu Asp Phe Ser Cys
 65                  70                  75                  80

Tyr Lys Pro Asp Pro Ser Leu Ile Cys Thr Arg Glu Thr Phe Met Asp
                 85                  90                  95

Arg Ser Gln Arg Val Gly Ile Phe Thr Glu Asp Asn Leu Ala Phe Gln
            100                 105                 110

Gln Lys Ile Leu Glu Arg Ser Gly Leu Gly Gln Lys Thr Tyr Phe Pro
        115                 120                 125

Glu Ala Leu Leu Arg Val Pro Pro Asn Pro Cys Met Glu Glu Ala Arg
    130                 135                 140

Lys Glu Ala Glu Thr Val Met Phe Gly Ala Ile Asp Ala Val Leu Glu
145                 150                 155                 160

Lys Thr Gly Val Lys Pro Lys Asp Ile Gly Ile Leu Val Val Asn Cys
                165                 170                 175

Ser Leu Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Ile Val Asn Lys
            180                 185                 190

Tyr Lys Leu Arg Gly Asn Ile Leu Ser Tyr Asn Phe Gly Gly Met Gly
        195                 200                 205
```

<210> 16
<211> 607
<212> DNA
<213> Arabidopsis thaliana

<220>
<221> CDS
<222> (1)..(606)

<400> 16

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aag ctt aag tta ggc tac cac tat ctg atc act cac ttt ttt aaa ctc   48
Lys Leu Lys Leu Gly Tyr His Tyr Leu Ile Thr His Phe Phe Lys Leu
  1               5                  10                  15

atg ttc ctc cct cta atg gct gtt ttg ttc atg aat gtc tca ttg tta   96
Met Phe Leu Pro Leu Met Ala Val Leu Phe Met Asn Val Ser Leu Leu
             20                  25                  30

agc cta aac cat ctt cag ctc tat tac aat tcc acc gga ttc atc ttc   144
Ser Leu Asn His Leu Gln Leu Tyr Tyr Asn Ser Thr Gly Phe Ile Phe
         35                  40                  45

gtc atc act ctc gcc att gtc gga tcc att gtc ttc ttc atg tct cga   192
Val Ile Thr Leu Ala Ile Val Gly Ser Ile Val Phe Phe Met Ser Arg
     50                  55                  60

cct aga tcc atc tac ctt cta gat tac tct tgc tac ctc ccg cct tcg   240
Pro Arg Ser Ile Tyr Leu Leu Asp Tyr Ser Cys Tyr Leu Pro Pro Ser
 65                  70                  75                  80

agt caa aaa gtt agc tac cag aaa ttc atg aac aac tct agt ttg att   288
Ser Gln Lys Val Ser Tyr Gln Lys Phe Met Asn Asn Ser Ser Leu Ile
                 85                  90                  95

caa gat ttc agc gaa act tct ctt gag ttc cag agg aag atc ttg att   336
Gln Asp Phe Ser Glu Thr Ser Leu Glu Phe Gln Arg Lys Ile Leu Ile
            100                 105                 110

cgc tct ggt ctc ggt gaa gag act tat tta ccg gat tct att cac tct   384
Arg Ser Gly Leu Gly Glu Glu Thr Tyr Leu Pro Asp Ser Ile His Ser
        115                 120                 125

atc cct ccg cgt cct act atg gct gca gcg cgt gaa gaa gcg gag cag   432
Ile Pro Pro Arg Pro Thr Met Ala Ala Ala Arg Glu Glu Ala Glu Gln
    130                 135                 140

gta atc ttc ggt gca ctc gac aat ctt ttc gag aat aca aaa atc aat   480
Val Ile Phe Gly Ala Leu Asp Asn Leu Phe Glu Asn Thr Lys Ile Asn
145                 150                 155                 160

cct agg gag att ggt gtt ctt gtt gtg aat tgt agt ttg ttt aac ccc   528
Pro Arg Glu Ile Gly Val Leu Val Val Asn Cys Ser Leu Phe Asn Pro
                165                 170                 175
```

```
acg cct tct tta tcc gcc atg att gtt aac aag tat aag ctt aga gga   576
Thr Pro Ser Leu Ser Ala Met Ile Val Asn Lys Tyr Lys Leu Arg Gly
            180                 185                 190

aac att aag agc ttt aat ctc ggc ggc atg g                        607
Asn Ile Lys Ser Phe Asn Leu Gly Gly Met
        195                 200


<210> 17
<211> 202
<212> PRT
<213> Arabidopsis thaliana

<400> 17
Lys Leu Lys Leu Gly Tyr His Tyr Leu Ile Thr His Phe Phe Lys Leu
  1               5                  10                  15

Met Phe Leu Pro Leu Met Ala Val Leu Phe Met Asn Val Ser Leu Leu
             20                  25                  30

Ser Leu Asn His Leu Gln Leu Tyr Tyr Asn Ser Thr Gly Phe Ile Phe
         35                  40                  45

Val Ile Thr Leu Ala Ile Val Gly Ser Ile Val Phe Phe Met Ser Arg
     50                  55                  60

Pro Arg Ser Ile Tyr Leu Leu Asp Tyr Ser Cys Tyr Leu Pro Pro Ser
 65                  70                  75                  80

Ser Gln Lys Val Ser Tyr Gln Lys Phe Met Asn Asn Ser Ser Leu Ile
                 85                  90                  95

Gln Asp Phe Ser Glu Thr Ser Leu Glu Phe Gln Arg Lys Ile Leu Ile
            100                 105                 110

Arg Ser Gly Leu Gly Glu Glu Thr Tyr Leu Pro Asp Ser Ile His Ser
        115                 120                 125

Ile Pro Pro Arg Pro Thr Met Ala Ala Ala Arg Glu Glu Ala Glu Gln
    130                 135                 140

Val Ile Phe Gly Ala Leu Asp Asn Leu Phe Glu Asn Thr Lys Ile Asn
145                 150                 155                 160

Pro Arg Glu Ile Gly Val Leu Val Val Asn Cys Ser Leu Phe Asn Pro
                165                 170                 175

Thr Pro Ser Leu Ser Ala Met Ile Val Asn Lys Tyr Lys Leu Arg Gly
            180                 185                 190

Asn Ile Lys Ser Phe Asn Leu Gly Gly Met
        195                 200
```

<210> 18
<211> 622
<212> DNA
<213> Arabidopsis thaliana

<220>
<221> CDS
<222> (1)..(621)

<400> 18

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aag ctt aaa ctg ggg tac cac tac ctc att act cat ctc ttc aag ctc   48
Lys Leu Lys Leu Gly Tyr His Tyr Leu Ile Thr His Leu Phe Lys Leu
  1               5                  10                  15

tgt ttg gtt cca tta atg gcg gtt tta gtc aca gag atc tcc cga tta   96
Cys Leu Val Pro Leu Met Ala Val Leu Val Thr Glu Ile Ser Arg Leu
             20                  25                  30

aca aca gac gat ctt tac cag att tgc ctt cat ctc caa tac aat ctc   144
Thr Thr Asp Asp Leu Tyr Gln Ile Cys Leu His Leu Gln Tyr Asn Leu
         35                  40                  45

gtt gct ttc atc ttt ctc tct gct tta gct atc ttt ggc tcc acc gtt   192
Val Ala Phe Ile Phe Leu Ser Ala Leu Ala Ile Phe Gly Ser Thr Val
     50                  55                  60

tac atc atg agt cgt ccc aga tct gtt tat ctc gtt gat tac tct tgt   240
Tyr Ile Met Ser Arg Pro Arg Ser Val Tyr Leu Val Asp Tyr Ser Cys
 65                  70                  75                  80

tat ctt cct ccg gag agt ctt cag gtt aag tat cag aag ttt atg gat   288
Tyr Leu Pro Pro Glu Ser Leu Gln Val Lys Tyr Gln Lys Phe Met Asp
                 85                  90                  95

cat tct aag ttg att gaa gat ttc aat gag tca tct tta gag ttt cag   336
His Ser Lys Leu Ile Glu Asp Phe Asn Glu Ser Ser Leu Glu Phe Gln
            100                 105                 110

agg aag att ctt gaa cgt tct ggt tta gga gaa gag act tat ctc cct   384
Arg Lys Ile Leu Glu Arg Ser Gly Leu Gly Glu Glu Thr Tyr Leu Pro
        115                 120                 125

gaa gct tta cat tgt atc cct ccg agg cct acg atg atg gcg gct cgt   432
Glu Ala Leu His Cys Ile Pro Pro Arg Pro Thr Met Met Ala Ala Arg
    130                 135                 140

gag gaa gct gag cag gta atg ttt ggt gct ctt gat aag ctt ttc gag   480
Glu Glu Ala Glu Gln Val Met Phe Gly Ala Leu Asp Lys Leu Phe Glu
145                 150                 155                 160
```

```
aat acc aag att aac cct agg gat att ggt gtg ttg gtt gtg aat tgt   528
Asn Thr Lys Ile Asn Pro Arg Asp Ile Gly Val Leu Val Val Asn Cys
                165                 170                 175

agc ttg ttt aat cct aca cct tcg ttg tca gct atg att gtt aac aag   576
Ser Leu Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Ile Val Asn Lys
            180                 185                 190

tat aag ctt aga ggg aat gtt aag agt ttt aac ctg ggg ggc att g     622
Tyr Lys Leu Arg Gly Asn Val Lys Ser Phe Asn Leu Gly Gly Ile
        195                 200                 205
```

<210> 19
<211> 207
<212> PRT
<213> Arabidopsis thaliana

<400> 19

```
Lys Leu Lys Leu Gly Tyr His Tyr Leu Ile Thr His Leu Phe Lys Leu
  1               5                  10                  15

Cys Leu Val Pro Leu Met Ala Val Leu Val Thr Glu Ile Ser Arg Leu
             20                  25                  30

Thr Thr Asp Asp Leu Tyr Gln Ile Cys Leu His Leu Gln Tyr Asn Leu
         35                  40                  45

Val Ala Phe Ile Phe Leu Ser Ala Leu Ala Ile Phe Gly Ser Thr Val
     50                  55                  60

Tyr Ile Met Ser Arg Pro Arg Ser Val Tyr Leu Val Asp Tyr Ser Cys
 65                  70                  75                  80

Tyr Leu Pro Pro Glu Ser Leu Gln Val Lys Tyr Gln Lys Phe Met Asp
                 85                  90                  95

His Ser Lys Leu Ile Glu Asp Phe Asn Glu Ser Ser Leu Glu Phe Gln
            100                 105                 110

Arg Lys Ile Leu Glu Arg Ser Gly Leu Gly Glu Glu Thr Tyr Leu Pro
        115                 120                 125

Glu Ala Leu His Cys Ile Pro Pro Arg Pro Thr Met Met Ala Ala Arg
    130                 135                 140

Glu Glu Ala Glu Gln Val Met Phe Gly Ala Leu Asp Lys Leu Phe Glu
145                 150                 155                 160

Asn Thr Lys Ile Asn Pro Arg Asp Ile Gly Val Leu Val Val Asn Cys
                165                 170                 175

Ser Leu Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Ile Val Asn Lys
            180                 185                 190
```

```
Tyr Lys Leu Arg Gly Asn Val Lys Ser Phe Asn Leu Gly Gly Ile
        195                 200                 205


<210> 20
<211> 625
<212> DNA
<213> Lunaria annua

<220>
<221> CDS
<222> (1)..(624)

<400> 20
aag ctt aag tta tgg tat cac tac ctg att tct cac ctt ttt aag ctc   48
Lys Leu Lys Leu Trp Tyr His Tyr Leu Ile Ser His Leu Phe Lys Leu
  1               5                  10                  15

ttg ttg gtt cct tta atg gcg gtt ctg ttc acg aat gtc tcc cgg tta   96
Leu Leu Val Pro Leu Met Ala Val Leu Phe Thr Asn Val Ser Arg Leu
             20                  25                  30

agc cta aac cag ctc tgt ctc gat ctc tct ctc cag ctc cag ttc aat   144
Ser Leu Asn Gln Leu Cys Leu Asp Leu Ser Leu Gln Leu Gln Phe Asn
         35                  40                  45

ctc gtc gga ttc atc ttc ttc att acc gtc tcc att ttc gga ttc aca   192
Leu Val Gly Phe Ile Phe Phe Ile Thr Val Ser Ile Phe Gly Phe Thr
     50                  55                  60

gtt atc ttc atg tcc cga cct aga tcc gtt tac ctc ctc gac tac tca   240
Val Ile Phe Met Ser Arg Pro Arg Ser Val Tyr Leu Leu Asp Tyr Ser
 65                  70                  75                  80

tgt tac ctc ccg ccg tcg aat ctc aaa gtt agc tac cag aca ttc atg   288
Cys Tyr Leu Pro Pro Ser Asn Leu Lys Val Ser Tyr Gln Thr Phe Met
                 85                  90                  95

aat cat tct aaa ctg att gaa gat ttc gac gag tcg tcg ctt gag ttc   336
Asn His Ser Lys Leu Ile Glu Asp Phe Asp Glu Ser Ser Leu Glu Phe
            100                 105                 110

cag cgg aag atc ctg aag cga tcc ggt ctc ggc gaa gag act tac ctc   384
Gln Arg Lys Ile Leu Lys Arg Ser Gly Leu Gly Glu Glu Thr Tyr Leu
        115                 120                 125

ccg gaa tct atc cac tgc atc ccg ccg cgt ccg act atg gcg gcg gcg   432
Pro Glu Ser Ile His Cys Ile Pro Pro Arg Pro Thr Met Ala Ala Ala
    130                 135                 140
```

```
cgt gag gaa tcg gag cag gta atc ttc ggt gca ctc gac aat ctc ttc   480
Arg Glu Glu Ser Glu Gln Val Ile Phe Gly Ala Leu Asp Asn Leu Phe
145                 150                 155                 160

gag aat acc aaa atc gac cct agg gag att ggt gtt gtg gtg gtg aac   528
Glu Asn Thr Lys Ile Asp Pro Arg Glu Ile Gly Val Val Val Val Asn
                165                 170                 175

tgc agc ttg ttt aac ccg acg cct tct tta tcc gcc atg att gtg aac   576
Cys Ser Leu Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Ile Val Asn
            180                 185                 190

aag tat aag ctt aga gga aac gtg aag agc ttt aat ctc ggt ggc atg g 625
Lys Tyr Lys Leu Arg Gly Asn Val Lys Ser Phe Asn Leu Gly Gly Met
        195                 200                 205
```

<210> 21
<211> 208
<212> PRT
<213> Lunaria annua

<400> 21

```
Lys Leu Lys Leu Trp Tyr His Tyr Leu Ile Ser His Leu Phe Lys Leu
  1               5                  10                  15

Leu Leu Val Pro Leu Met Ala Val Leu Phe Thr Asn Val Ser Arg Leu
            20                  25                  30

Ser Leu Asn Gln Leu Cys Leu Asp Leu Ser Leu Gln Leu Gln Phe Asn
        35                  40                  45

Leu Val Gly Phe Ile Phe Phe Ile Thr Val Ser Ile Phe Gly Phe Thr
    50                  55                  60

Val Ile Phe Met Ser Arg Pro Arg Ser Val Tyr Leu Leu Asp Tyr Ser
65                  70                  75                  80

Cys Tyr Leu Pro Pro Ser Asn Leu Lys Val Ser Tyr Gln Thr Phe Met
                85                  90                  95

Asn His Ser Lys Leu Ile Glu Asp Phe Asp Glu Ser Ser Leu Glu Phe
            100                 105                 110

Gln Arg Lys Ile Leu Lys Arg Ser Gly Leu Gly Glu Glu Thr Tyr Leu
        115                 120                 125

Pro Glu Ser Ile His Cys Ile Pro Pro Arg Pro Thr Met Ala Ala Ala
    130                 135                 140

Arg Glu Glu Ser Glu Gln Val Ile Phe Gly Ala Leu Asp Asn Leu Phe
145                 150                 155                 160
```

```
Glu Asn Thr Lys Ile Asp Pro Arg Glu Ile Gly Val Val Val Val Asn
                165                 170                 175

Cys Ser Leu Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Ile Val Asn
            180                 185                 190

Lys Tyr Lys Leu Arg Gly Asn Val Lys Ser Phe Asn Leu Gly Gly Met
        195                 200                 205
```

<210> 22
<211> 1704
<212> DNA
<213> Lunaria annua

<220>
<221> CDS
<222> (42)..(1535)

<220>
<221> modified_base
<222> (345)
<223> a, c, t, or g

<400> 22
gttcattgat ttgtttgaga ctctgttgca gaaatctcca c atg gat gat gaa tcc 56
                                              Met Asp Asp Glu Ser
                                                1   5

```
gtt aat gga gga tcc gta cag atc cgg acc cga aag tac gtc aag ctg   104
Val Asn Gly Gly Ser Val Gln Ile Arg Thr Arg Lys Tyr Val Lys Leu
                10                  15                  20

ggt tat cac tac ctg att tct cac ctt ttt aag ctc ttg ttg gtt cct   152
Gly Tyr His Tyr Leu Ile Ser His Leu Phe Lys Leu Leu Leu Val Pro
            25                  30                  35

tta atg gcg gtt ctg ttc acg aat gtc tcc cgg tta agc cta aac cag   200
Leu Met Ala Val Leu Phe Thr Asn Val Ser Arg Leu Ser Leu Asn Gln
        40                  45                  50

ctc tgt ctc gat ctc tct ctc cag ctc cag ttc aat ctc gtc gga ttc   248
Leu Cys Leu Asp Leu Ser Leu Gln Leu Gln Phe Asn Leu Val Gly Phe
    55                  60                  65

atc ttc ttc att acc gcc tcc att ttc gga ttc aca gtt atc ttc atg   296
Ile Phe Phe Ile Thr Ala Ser Ile Phe Gly Phe Thr Val Ile Phe Met
70                  75                  80                  85

tcc cga cct aga tcc gtt tac ctc ctc gac tac tca tgt tac ctc ccg   344
Ser Arg Pro Arg Ser Val Tyr Leu Leu Asp Tyr Ser Cys Tyr Leu Pro
                90                  95                  100
```

```
ncg gcg aat ctc aaa gtt agc tac cag aca ttc atg aat cat tct aaa   392
Xaa Ala Asn Leu Lys Val Ser Tyr Gln Thr Phe Met Asn His Ser Lys
            105                 110                 115

ctg att gaa gat ttc gac gag tcg tcg ctt gag ttc cag cgg aag atc   440
Leu Ile Glu Asp Phe Asp Glu Ser Ser Leu Glu Phe Gln Arg Lys Ile
        120                 125                 130

ctg aag cga tcc ggt ctc ggc gaa gag act tac ctc ccg gaa tct atc   488
Leu Lys Arg Ser Gly Leu Gly Glu Glu Thr Tyr Leu Pro Glu Ser Ile
    135                 140                 145

cac tgc atc ccg ccg cgt ccg act atg gcg gcg gcg cgt gag gaa tcg   536
His Cys Ile Pro Pro Arg Pro Thr Met Ala Ala Ala Arg Glu Glu Ser
150                 155                 160                 165

gag cag gta atc ttc ggt gca ctc gac aat ctc ttc gag aat acc aaa   584
Glu Gln Val Ile Phe Gly Ala Leu Asp Asn Leu Phe Glu Asn Thr Lys
                170                 175                 180

atc gac cct agg gag att ggt gtt gtg gtg gtg aac tgc agc ttg ttt   632
Ile Asp Pro Arg Glu Ile Gly Val Val Val Val Asn Cys Ser Leu Phe
            185                 190                 195

aac ccg acg cct tct tta tcc gcc atg att gtg aac aag tat aag ctt   680
Asn Pro Thr Pro Ser Leu Ser Ala Met Ile Val Asn Lys Tyr Lys Leu
        200                 205                 210

aga gga aac gtg aag agc ttt aac ctc gga gga atg gga tgt agg gct   728
Arg Gly Asn Val Lys Ser Phe Asn Leu Gly Gly Met Gly Cys Arg Ala
    215                 220                 225

ggt gtc atc gcc gtt gat ctc gct aat gac att tta cag ctc cat aga   776
Gly Val Ile Ala Val Asp Leu Ala Asn Asp Ile Leu Gln Leu His Arg
230                 235                 240                 245

aac aca tta gct ctt gtg gtt agc aca gag aac atc act cag aat tgg   824
Asn Thr Leu Ala Leu Val Val Ser Thr Glu Asn Ile Thr Gln Asn Trp
                250                 255                 260

tac ttt ggt aac aac aaa gca atg ttg att cct aat tgc ttg ttt agg   872
Tyr Phe Gly Asn Asn Lys Ala Met Leu Ile Pro Asn Cys Leu Phe Arg
            265                 270                 275

gtt ggt gga tcc gcg gtt ctg ctt tcg aac aag cct cgt gat cga aaa   920
Val Gly Gly Ser Ala Val Leu Leu Ser Asn Lys Pro Arg Asp Arg Lys
        280                 285                 290

cga tcc aag tat aaa ctt gtt cac acg gta cgg act cat aaa gga tct   968
Arg Ser Lys Tyr Lys Leu Val His Thr Val Arg Thr His Lys Gly Ser
    295                 300                 305
```

```
gat gag aaa gca ttc aac tgt gtg tac caa gaa caa gac gag gac ttg   1016
Asp Glu Lys Ala Phe Asn Cys Val Tyr Gln Glu Gln Asp Glu Asp Leu
310                 315                 320                 325

aaa acc gga gtt tct ttg tct aaa gac cta atg tct ata gct gga gaa   1064
Lys Thr Gly Val Ser Leu Ser Lys Asp Leu Met Ser Ile Ala Gly Glu
                330                 335                 340

gct cta aag aca aat atc acc act ttg ggt cct ctg gtt ctt cca ata   1112
Ala Leu Lys Thr Asn Ile Thr Thr Leu Gly Pro Leu Val Leu Pro Ile
            345                 350                 355

agc gag cag att ctg ttc att gcg act ttt gtt gca aag aga ttg ttc   1160
Ser Glu Gln Ile Leu Phe Ile Ala Thr Phe Val Ala Lys Arg Leu Phe
        360                 365                 370

agt gcc aag aag aag aag aag aag cct tac ata ccg gat ttc aag ctt   1208
Ser Ala Lys Lys Lys Lys Lys Lys Pro Tyr Ile Pro Asp Phe Lys Leu
    375                 380                 385

gcc ttt gat cat ttc tgt att cac gca gga ggt aga gcc gtg atc gat   1256
Ala Phe Asp His Phe Cys Ile His Ala Gly Gly Arg Ala Val Ile Asp
390                 395                 400                 405

gaa cta gag aag agt tta aag cta ttg cca aaa cat gtg gag gct tct   1304
Glu Leu Glu Lys Ser Leu Lys Leu Leu Pro Lys His Val Glu Ala Ser
                410                 415                 420

aga atg aca ttg cat aga ttt gga aac act tca tcg agc tct att tgg   1352
Arg Met Thr Leu His Arg Phe Gly Asn Thr Ser Ser Ser Ser Ile Trp
            425                 430                 435

tat gaa tta gct tac aca gaa gct aaa gga aga atg aga aaa ggg aat   1400
Tyr Glu Leu Ala Tyr Thr Glu Ala Lys Gly Arg Met Arg Lys Gly Asn
        440                 445                 450

cga gtt tgg cag att gct ttt gga agc ggc ttt aag tgt aac agc gcg   1448
Arg Val Trp Gln Ile Ala Phe Gly Ser Gly Phe Lys Cys Asn Ser Ala
    455                 460                 465

gtt tgg gtg gct ctt cgt gat gtc gag ccc tcg gtt aac aat cct tgg   1496
Val Trp Val Ala Leu Arg Asp Val Glu Pro Ser Val Asn Asn Pro Trp
470                 475                 480                 485

gaa cat tgc atc cat aga tat ccg gtt aag atc gat ctc tgatttcagc    1545
Glu His Cys Ile His Arg Tyr Pro Val Lys Ile Asp Leu
                490                 495

ttaaccggta aaattggtct gtacatatat ttaccactga gtaaagacat cagttaatga 1605

tttgttgtta ctcaattggg ctaagtgtat tattatatgt gttgtatata ataaaggtag 1665

aacgtaaatt tactaagaaa aaaaaaaaaa aaaaaaaaa                        1704
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<210> 23
<211> 498
<212> PRT
<213> Lunaria annua

<220>
<221> MOD_RES
<222> (102)
<223> Variable amino acid

<400> 23

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Met Asp Asp Glu Ser Val Asn Gly Gly Ser Val Gln Ile Arg Thr Arg
  1               5                  10                  15

Lys Tyr Val Lys Leu Gly Tyr His Tyr Leu Ile Ser His Leu Phe Lys
             20                  25                  30

Leu Leu Leu Val Pro Leu Met Ala Val Leu Phe Thr Asn Val Ser Arg
         35                  40                  45

Leu Ser Leu Asn Gln Leu Cys Leu Asp Leu Ser Leu Gln Leu Gln Phe
     50                  55                  60

Asn Leu Val Gly Phe Ile Phe Phe Ile Thr Ala Ser Ile Phe Gly Phe
 65                  70                  75                  80

Thr Val Ile Phe Met Ser Arg Pro Arg Ser Val Tyr Leu Leu Asp Tyr
                 85                  90                  95

Ser Cys Tyr Leu Pro Xaa Ala Asn Leu Lys Val Ser Tyr Gln Thr Phe
            100                 105                 110

Met Asn His Ser Lys Leu Ile Glu Asp Phe Asp Glu Ser Ser Leu Glu
        115                 120                 125

Phe Gln Arg Lys Ile Leu Lys Arg Ser Gly Leu Gly Glu Glu Thr Tyr
    130                 135                 140

Leu Pro Glu Ser Ile His Cys Ile Pro Pro Arg Pro Thr Met Ala Ala
145                 150                 155                 160

Ala Arg Glu Glu Ser Glu Gln Val Ile Phe Gly Ala Leu Asp Asn Leu
                165                 170                 175

Phe Glu Asn Thr Lys Ile Asp Pro Arg Glu Ile Gly Val Val Val Val
            180                 185                 190

Asn Cys Ser Leu Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Ile Val
        195                 200                 205

Asn Lys Tyr Lys Leu Arg Gly Asn Val Lys Ser Phe Asn Leu Gly Gly
    210                 215                 220
```

```
Met Gly Cys Arg Ala Gly Val Ile Ala Val Asp Leu Ala Asn Asp Ile
225                 230                 235                 240

Leu Gln Leu His Arg Asn Thr Leu Ala Leu Val Val Ser Thr Glu Asn
                245                 250                 255

Ile Thr Gln Asn Trp Tyr Phe Gly Asn Asn Lys Ala Met Leu Ile Pro
            260                 265                 270

Asn Cys Leu Phe Arg Val Gly Gly Ser Ala Val Leu Leu Ser Asn Lys
        275                 280                 285

Pro Arg Asp Arg Lys Arg Ser Lys Tyr Lys Leu Val His Thr Val Arg
    290                 295                 300

Thr His Lys Gly Ser Asp Glu Lys Ala Phe Asn Cys Val Tyr Gln Glu
305                 310                 315                 320

Gln Asp Glu Asp Leu Lys Thr Gly Val Ser Leu Ser Lys Asp Leu Met
                325                 330                 335

Ser Ile Ala Gly Glu Ala Leu Lys Thr Asn Ile Thr Thr Leu Gly Pro
            340                 345                 350

Leu Val Leu Pro Ile Ser Glu Gln Ile Leu Phe Ile Ala Thr Phe Val
        355                 360                 365

Ala Lys Arg Leu Phe Ser Ala Lys Lys Lys Lys Lys Lys Pro Tyr Ile
    370                 375                 380

Pro Asp Phe Lys Leu Ala Phe Asp His Phe Cys Ile His Ala Gly Gly
385                 390                 395                 400

Arg Ala Val Ile Asp Glu Leu Glu Lys Ser Leu Lys Leu Leu Pro Lys
                405                 410                 415

His Val Glu Ala Ser Arg Met Thr Leu His Arg Phe Gly Asn Thr Ser
            420                 425                 430

Ser Ser Ser Ile Trp Tyr Glu Leu Ala Tyr Thr Glu Ala Lys Gly Arg
        435                 440                 445

Met Arg Lys Gly Asn Arg Val Trp Gln Ile Ala Phe Gly Ser Gly Phe
    450                 455                 460

Lys Cys Asn Ser Ala Val Trp Val Ala Leu Arg Asp Val Glu Pro Ser
465                 470                 475                 480

Val Asn Asn Pro Trp Glu His Cys Ile His Arg Tyr Pro Val Lys Ile
                485                 490                 495

Asp Leu
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<210> 24
<211> 1664
<212> DNA
<213> Lunaria annua

<220>
<221> CDS
<222> (3)..(1517)

<220>
<221> modified_base
<222> (155)
<223> a, c, t, or g

<220>
<221> modified_base
<222> (217)
<223> a, c, t, or g

<400> 24

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ca atg acg tct gtg aac gta aaa ctc ctt tac cat tac gtc ata acc    47
   Met Thr Ser Val Asn Val Lys Leu Leu Tyr His Tyr Val Ile Thr
     1               5                  10                  15

aac ttt ttc aac ctc tgt ttc ttc cca ctg acg ggg atc ctc gcc gga   95
Asn Phe Phe Asn Leu Cys Phe Phe Pro Leu Thr Gly Ile Leu Ala Gly
                 20                  25                  30

aaa ggc tct cgt ctt acc aca aac gat ctc cac cac ttc tat tca tat   143
Lys Gly Ser Arg Leu Thr Thr Asn Asp Leu His His Phe Tyr Ser Tyr
             35                  40                  45

ctc caa cac aan ctt ata acc tta acc cta ctc ttt ggc ttc acc gtt   191
Leu Gln His Xaa Leu Ile Thr Leu Thr Leu Leu Phe Gly Phe Thr Val
         50                  55                  60

ttt ggt tcg gtt ctc tac ttc gta anc cga ccc aaa ccg gtt tac ctc   239
Phe Gly Ser Val Leu Tyr Phe Val Xaa Arg Pro Lys Pro Val Tyr Leu
     65                  70                  75

gtt gac tac tcc tgc tac ctt cca cca caa cat ctt agc gct ggt atc   287
Val Asp Tyr Ser Cys Tyr Leu Pro Pro Gln His Leu Ser Ala Gly Ile
 80                  85                  90                  95

tct aag acc atg gaa atc ttt tat caa ata aga aaa tct gat cct tta   335
Ser Lys Thr Met Glu Ile Phe Tyr Gln Ile Arg Lys Ser Asp Pro Leu
                100                 105                 110

cga aac gtg gca tta gat gat tcg tct tct ctt gat ttc ttg aga aag   383
Arg Asn Val Ala Leu Asp Asp Ser Ser Ser Leu Asp Phe Leu Arg Lys
            115                 120                 125
```

```
att caa gag cgt tca ggt cta ggc gat gaa acc tac ggc ccc gag gga   431
Ile Gln Glu Arg Ser Gly Leu Gly Asp Glu Thr Tyr Gly Pro Glu Gly
        130                 135                 140

ctg ttt gag att cct ccg agg aag aat tta gcg tcg gcg cgt gaa gag   479
Leu Phe Glu Ile Pro Pro Arg Lys Asn Leu Ala Ser Ala Arg Glu Glu
    145                 150                 155

acg gag caa gta atc aac ggt gcg cta aaa aat cta ttc gag aac aac   527
Thr Glu Gln Val Ile Asn Gly Ala Leu Lys Asn Leu Phe Glu Asn Asn
160                 165                 170                 175

aaa gtt aac cct aaa gag att ggt ata ctt gtg gtg aac tca agc atg   575
Lys Val Asn Pro Lys Glu Ile Gly Ile Leu Val Val Asn Ser Ser Met
                180                 185                 190

ttt aat ccg act cct tcg tta tcc gcg atg gta gtt aat act tcc aag   623
Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Val Val Asn Thr Ser Lys
            195                 200                 205

ctc cga agc aac atc aaa agc ttt aat ctt gga gga atg ggt tgc agt   671
Leu Arg Ser Asn Ile Lys Ser Phe Asn Leu Gly Gly Met Gly Cys Ser
        210                 215                 220

gct ggt gtt atc gcc att gat cta gct aaa gac ttg ttg cat gtt cat   719
Ala Gly Val Ile Ala Ile Asp Leu Ala Lys Asp Leu Leu His Val His
    225                 230                 235

aaa aac aca tat gct ctt gtg gtg agc aca gag aac atc act caa aac   767
Lys Asn Thr Tyr Ala Leu Val Val Ser Thr Glu Asn Ile Thr Gln Asn
240                 245                 250                 255

att tat acc ggt gat aac aga tcc atg atg gtt tcg aat tgc ttg ttc   815
Ile Tyr Thr Gly Asp Asn Arg Ser Met Met Val Ser Asn Cys Leu Phe
                260                 265                 270

cgt gtc ggt ggg gca gcg att ctg ctc tcc aac aag ccg ggg gat cga   863
Arg Val Gly Gly Ala Ala Ile Leu Leu Ser Asn Lys Pro Gly Asp Arg
            275                 280                 285

aga cgg tcc aag tac aag cta gct cac acg gtt cga acg cat acc gga   911
Arg Arg Ser Lys Tyr Lys Leu Ala His Thr Val Arg Thr His Thr Gly
        290                 295                 300

gct gac gac aag tct ttt gga tgt gtg cgg caa gaa gaa gat gat agc   959
Ala Asp Asp Lys Ser Phe Gly Cys Val Arg Gln Glu Glu Asp Asp Ser
    305                 310                 315

ggt aaa acc gga gtt agt ttg tca aaa gac ata acc gtt gtt gcc ggg  1007
Gly Lys Thr Gly Val Ser Leu Ser Lys Asp Ile Thr Val Val Ala Gly
320                 325                 330                 335
```

```
ata acg gtt cag aaa aac ata aca aca ttg ggt ccg ttg gtt ctt cct   1055
Ile Thr Val Gln Lys Asn Ile Thr Thr Leu Gly Pro Leu Val Leu Pro
                340                 345                 350

ctg agc gaa aaa atc ctt ttt gtc gtt aca ttc gta gcc aag aaa cta   1103
Leu Ser Glu Lys Ile Leu Phe Val Val Thr Phe Val Ala Lys Lys Leu
            355                 360                 365

tta aaa gat aag atc aaa cac tat tac gtg ccg gat ttc aaa ctt gca   1151
Leu Lys Asp Lys Ile Lys His Tyr Tyr Val Pro Asp Phe Lys Leu Ala
        370                 375                 380

gta gat cat ttc tgt att cat gcg gga ggt aga gcc gtg ata gat gtg   1199
Val Asp His Phe Cys Ile His Ala Gly Gly Arg Ala Val Ile Asp Val
    385                 390                 395

tta gag aag aac tta ggg cta tcg ccg ata gat gtg gag gca tca aga   1247
Leu Glu Lys Asn Leu Gly Leu Ser Pro Ile Asp Val Glu Ala Ser Arg
400                 405                 410                 415

tca aca tta cat aga ttt ggg aat aca tcg tct agt tca att tgg tat   1295
Ser Thr Leu His Arg Phe Gly Asn Thr Ser Ser Ser Ser Ile Trp Tyr
                420                 425                 430

gaa tta gca tac ata gag cca aaa gga agg atg aag aaa ggt aat aaa   1343
Glu Leu Ala Tyr Ile Glu Pro Lys Gly Arg Met Lys Lys Gly Asn Lys
            435                 440                 445

gct tgc caa ata gct ggt ggg tca ggt ttt aag tgt aat agt gcg gtt   1391
Ala Cys Gln Ile Ala Gly Gly Ser Gly Phe Lys Cys Asn Ser Ala Val
        450                 455                 460

tgg gtc gct tta cgc aat gtc gag gct tca gct aat agt cct tgg gaa   1439
Trp Val Ala Leu Arg Asn Val Glu Ala Ser Ala Asn Ser Pro Trp Glu
    465                 470                 475

cat tgc att cac aaa tat ccg gtt caa atg tat tct ggt tca tca aag   1487
His Cys Ile His Lys Tyr Pro Val Gln Met Tyr Ser Gly Ser Ser Lys
480                 485                 490                 495

tca gag act cct gtc caa aac ggt cgg tcc taatttatgt atctcaaatg     1537
Ser Glu Thr Pro Val Gln Asn Gly Arg Ser
                500                 505

atgttgtcca ctttctcttt ttttttttct ttttttagtt ataatttaat ggttacgatg 1597

ttttgtctag gtcgttataa ataaagaata catgggtgtt actagtataa aaaaaaaaaa 1657

aaaaaaa                                                          1664
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<210> 25
<211> 505
<212> PRT
<213> Lunaria annua

<220>
<221> MOD_RES
<222> (51)
<223> Variable amino acid

<220>
<221> MOD_RES
<222> (72)
<223> Variable amino acid

<400> 25

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Met Thr Ser Val Asn Val Lys Leu Leu Tyr His Tyr Val Ile Thr Asn
  1               5                  10                  15

Phe Phe Asn Leu Cys Phe Phe Pro Leu Thr Gly Ile Leu Ala Gly Lys
             20                  25                  30

Gly Ser Arg Leu Thr Thr Asn Asp Leu His His Phe Tyr Ser Tyr Leu
         35                  40                  45

Gln His Xaa Leu Ile Thr Leu Thr Leu Leu Phe Gly Phe Thr Val Phe
     50                  55                  60

Gly Ser Val Leu Tyr Phe Val Xaa Arg Pro Lys Pro Val Tyr Leu Val
 65                  70                  75                  80

Asp Tyr Ser Cys Tyr Leu Pro Pro Gln His Leu Ser Ala Gly Ile Ser
                 85                  90                  95

Lys Thr Met Glu Ile Phe Tyr Gln Ile Arg Lys Ser Asp Pro Leu Arg
            100                 105                 110

Asn Val Ala Leu Asp Asp Ser Ser Ser Leu Asp Phe Leu Arg Lys Ile
        115                 120                 125

Gln Glu Arg Ser Gly Leu Gly Asp Glu Thr Tyr Gly Pro Glu Gly Leu
    130                 135                 140

Phe Glu Ile Pro Pro Arg Lys Asn Leu Ala Ser Ala Arg Glu Glu Thr
145                 150                 155                 160

Glu Gln Val Ile Asn Gly Ala Leu Lys Asn Leu Phe Glu Asn Asn Lys
                165                 170                 175

Val Asn Pro Lys Glu Ile Gly Ile Leu Val Val Asn Ser Ser Met Phe
            180                 185                 190

Asn Pro Thr Pro Ser Leu Ser Ala Met Val Val Asn Thr Ser Lys Leu
        195                 200                 205
```

```
Arg Ser Asn Ile Lys Ser Phe Asn Leu Gly Gly Met Gly Cys Ser Ala
    210                 215                 220

Gly Val Ile Ala Ile Asp Leu Ala Lys Asp Leu Leu His Val His Lys
225                 230                 235                 240

Asn Thr Tyr Ala Leu Val Val Ser Thr Glu Asn Ile Thr Gln Asn Ile
                245                 250                 255

Tyr Thr Gly Asp Asn Arg Ser Met Met Val Ser Asn Cys Leu Phe Arg
            260                 265                 270

Val Gly Gly Ala Ala Ile Leu Leu Ser Asn Lys Pro Gly Asp Arg Arg
        275                 280                 285

Arg Ser Lys Tyr Lys Leu Ala His Thr Val Arg Thr His Thr Gly Ala
    290                 295                 300

Asp Asp Lys Ser Phe Gly Cys Val Arg Gln Glu Glu Asp Asp Ser Gly
305                 310                 315                 320

Lys Thr Gly Val Ser Leu Ser Lys Asp Ile Thr Val Val Ala Gly Ile
                325                 330                 335

Thr Val Gln Lys Asn Ile Thr Thr Leu Gly Pro Leu Val Leu Pro Leu
            340                 345                 350

Ser Glu Lys Ile Leu Phe Val Val Thr Phe Val Ala Lys Lys Leu Leu
        355                 360                 365

Lys Asp Lys Ile Lys His Tyr Tyr Val Pro Asp Phe Lys Leu Ala Val
    370                 375                 380

Asp His Phe Cys Ile His Ala Gly Gly Arg Ala Val Ile Asp Val Leu
385                 390                 395                 400

Glu Lys Asn Leu Gly Leu Ser Pro Ile Asp Val Glu Ala Ser Arg Ser
                405                 410                 415

Thr Leu His Arg Phe Gly Asn Thr Ser Ser Ser Ser Ile Trp Tyr Glu
            420                 425                 430

Leu Ala Tyr Ile Glu Pro Lys Gly Arg Met Lys Lys Gly Asn Lys Ala
        435                 440                 445

Cys Gln Ile Ala Gly Gly Ser Gly Phe Lys Cys Asn Ser Ala Val Trp
    450                 455                 460

Val Ala Leu Arg Asn Val Glu Ala Ser Ala Asn Ser Pro Trp Glu His
465                 470                 475                 480

Cys Ile His Lys Tyr Pro Val Gln Met Tyr Ser Gly Ser Ser Lys Ser
                485                 490                 495
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Glu Thr Pro Val Gln Asn Gly Arg Ser
            500                 505



<210> 26
<211> 1732
<212> DNA
<213> Lunaria annua

<220>
<221> CDS
<222> (19)..(1611)

<400> 26
ctttcttctt ccccaaca atg acc cat aac caa aac caa cct cac cgg gca   51
                      Met Thr His Asn Gln Asn Gln Pro His Arg Ala
                        1               5                  10

gtt ccg gtt cac gtt aca aac tcc gat caa aac caa aac caa aac caa   99
Val Pro Val His Val Thr Asn Ser Asp Gln Asn Gln Asn Gln Asn Gln
             15                  20                  25

aac aat ctc cca aat ttt ctc tta tct gtt cgg ctc aaa tat gta aaa   147
Asn Asn Leu Pro Asn Phe Leu Leu Ser Val Arg Leu Lys Tyr Val Lys
         30                  35                  40

ctt ggg tac cat tac cta atc tcc aac ggt ctc tac atc ctc ctc ctc   195
Leu Gly Tyr His Tyr Leu Ile Ser Asn Gly Leu Tyr Ile Leu Leu Leu
     45                  50                  55

cct ctc ctc ggc ggc aca atc gta aaa ctc tct tcc ttc aca ctc aac   243
Pro Leu Leu Gly Gly Thr Ile Val Lys Leu Ser Ser Phe Thr Leu Asn
 60                  65                  70                  75

gaa ctc tct ctc ctc tac aac cac ctc cgt ttt cat ttc ctc tcc gcc   291
Glu Leu Ser Leu Leu Tyr Asn His Leu Arg Phe His Phe Leu Ser Ala
                 80                  85                  90

aca ctc gct acc gga ctc tta atc tct ctc tcc acc gcc tac ttc acc   339
Thr Leu Ala Thr Gly Leu Leu Ile Ser Leu Ser Thr Ala Tyr Phe Thr
             95                  100                 105

acc cgt cct cgt cat gtc ttc ctc ctc gac ttc tca tgc tac aaa cct   387
Thr Arg Pro Arg His Val Phe Leu Leu Asp Phe Ser Cys Tyr Lys Pro
        110                 115                 120

gac cct tcc tta ata tgc act cgt gaa aca ttc atg gac cga tct caa   435
Asp Pro Ser Leu Ile Cys Thr Arg Glu Thr Phe Met Asp Arg Ser Gln
    125                 130                 135
```

```
cgt gta ggt atc ttc aca gaa gac aac ctc gct ttt caa caa aag atc   483
Arg Val Gly Ile Phe Thr Glu Asp Asn Leu Ala Phe Gln Gln Lys Ile
140                 145                 150                 155

ctc gaa aga tcc ggt ctt ggg cag aaa act tac ttc cct gaa gct ctt   531
Leu Glu Arg Ser Gly Leu Gly Gln Lys Thr Tyr Phe Pro Glu Ala Leu
                160                 165                 170

ctt cgt gtt cct ccc aat cct tgt atg gaa gaa gcg aga aaa gaa gca   579
Leu Arg Val Pro Pro Asn Pro Cys Met Glu Glu Ala Arg Lys Glu Ala
            175                 180                 185

gag act gtt atg ttc gga gct ata gac tct gtt ctt gag aaa acc ggt   627
Glu Thr Val Met Phe Gly Ala Ile Asp Ser Val Leu Glu Lys Thr Gly
        190                 195                 200

gtg aaa cct aaa gat atc gga atc ctt gtc gtg aat tgt agt ttg ttt   675
Val Lys Pro Lys Asp Ile Gly Ile Leu Val Val Asn Cys Ser Leu Phe
    205                 210                 215

aat ccg acg ccg tca ctt tcc gcc atg att gtg aat aag tat aag ctt   723
Asn Pro Thr Pro Ser Leu Ser Ala Met Ile Val Asn Lys Tyr Lys Leu
220                 225                 230                 235

aga gga aac att ttg agc tat aat ctc ggt gga atg ggt tgt agt gct   771
Arg Gly Asn Ile Leu Ser Tyr Asn Leu Gly Gly Met Gly Cys Ser Ala
                240                 245                 250

gga ctt atc tcc att gat ctc gct aaa cag ctt ctt cag gtc caa cca   819
Gly Leu Ile Ser Ile Asp Leu Ala Lys Gln Leu Leu Gln Val Gln Pro
            255                 260                 265

aac tca tac gca cta gtg gtg agc aca gag aac ata acc tta aac tgg   867
Asn Ser Tyr Ala Leu Val Val Ser Thr Glu Asn Ile Thr Leu Asn Trp
        270                 275                 280

tac tta ggc aac gac cga tca atg ctt ctc tct aac tgc atc ttc cgt   915
Tyr Leu Gly Asn Asp Arg Ser Met Leu Leu Ser Asn Cys Ile Phe Arg
    285                 290                 295

atg gga gga gcc gcc gta ctt ctc tca aac cgt tcc tcc gat cgc acc   963
Met Gly Gly Ala Ala Val Leu Leu Ser Asn Arg Ser Ser Asp Arg Thr
300                 305                 310                 315

cgt tca aaa tat cag ctc atc cac ccc gtc cgt acc cac aaa gga gcc   1011
Arg Ser Lys Tyr Gln Leu Ile His Pro Val Arg Thr His Lys Gly Ala
                320                 325                 330

aac gac aac gca ttt ggc tgc gtt tac caa cga gaa gac aac aac gaa   1059
Asn Asp Asn Ala Phe Gly Cys Val Tyr Gln Arg Glu Asp Asn Asn Glu
            335                 340                 345
```

```
gaa gaa acc gcc aaa atc gga gtc tca ctc tct aaa aac cta atg gca   1107
Glu Glu Thr Ala Lys Ile Gly Val Ser Leu Ser Lys Asn Leu Met Ala
        350                 355                 360

ata gcc gga gaa gct ctc aag aca aac ata aca aca ctc gga cca cta   1155
Ile Ala Gly Glu Ala Leu Lys Thr Asn Ile Thr Thr Leu Gly Pro Leu
    365                 370                 375

gtc tta cca atg tcc gaa cag att ctg ttt ttc cca aca ctc gtg gct   1203
Val Leu Pro Met Ser Glu Gln Ile Leu Phe Phe Pro Thr Leu Val Ala
380                 385                 390                 395

cga aaa atc ttc aaa gtc aag aaa ata aag cct tac ata ccc gat ttc   1251
Arg Lys Ile Phe Lys Val Lys Lys Ile Lys Pro Tyr Ile Pro Asp Phe
                400                 405                 410

aag cta gct ttc gag cat ttc tgc atc cat gcg gga ggt aga gca gtg   1299
Lys Leu Ala Phe Glu His Phe Cys Ile His Ala Gly Gly Arg Ala Val
            415                 420                 425

ctt gat gag ata gag aag aat ttg gat tta tca gag tgg cat atg gaa   1347
Leu Asp Glu Ile Glu Lys Asn Leu Asp Leu Ser Glu Trp His Met Glu
        430                 435                 440

cca tcg agg atg act tta aac cgg ttt ggt aat act tcg agt agc tca   1395
Pro Ser Arg Met Thr Leu Asn Arg Phe Gly Asn Thr Ser Ser Ser Ser
    445                 450                 455

ctt tgg tat gaa ctt gcg tat agt gaa gct aaa ggg agg att aag aga   1443
Leu Trp Tyr Glu Leu Ala Tyr Ser Glu Ala Lys Gly Arg Ile Lys Arg
460                 465                 470                 475

gga gat agg act tgc caa att gcg ttt gga tcg gga ttt aag tgt aat   1491
Gly Asp Arg Thr Cys Gln Ile Ala Phe Gly Ser Gly Phe Lys Cys Asn
                480                 485                 490

agt gcg gtt tgg aaa gct ttg aga acc att gat cct att gat gag aag   1539
Ser Ala Val Trp Lys Ala Leu Arg Thr Ile Asp Pro Ile Asp Glu Lys
            495                 500                 505

aag aat cca tgg agt gat gag att cat gag ttt cca gtt tct gtt cct   1587
Lys Asn Pro Trp Ser Asp Glu Ile His Glu Phe Pro Val Ser Val Pro
        510                 515                 520

agg atc act cca gtt act tct aac tagtgttttt tttttgggtc caactaggga  1641
Arg Ile Thr Pro Val Thr Ser Asn
    525                 530

taatatttgt tatggttttg ttcttacgta cgtactttaa gtgatttagt ctaaaaataa 1701

attggtttca taaaaaaaaa aaaaaaaaaa a                                1732
```

<210> 27
<211> 531
<212> PRT
<213> Lunaria annua

<400> 27

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Met Thr His Asn Gln Asn Gln Pro His Arg Ala Val Pro Val His Val
  1               5                  10                  15

Thr Asn Ser Asp Gln Asn Gln Asn Gln Asn Gln Asn Asn Leu Pro Asn
             20                  25                  30

Phe Leu Leu Ser Val Arg Leu Lys Tyr Val Lys Leu Gly Tyr His Tyr
         35                  40                  45

Leu Ile Ser Asn Gly Leu Tyr Ile Leu Leu Leu Pro Leu Leu Gly Gly
     50                  55                  60

Thr Ile Val Lys Leu Ser Ser Phe Thr Leu Asn Glu Leu Ser Leu Leu
 65                  70                  75                  80

Tyr Asn His Leu Arg Phe His Phe Leu Ser Ala Thr Leu Ala Thr Gly
                 85                  90                  95

Leu Leu Ile Ser Leu Ser Thr Ala Tyr Phe Thr Thr Arg Pro Arg His
            100                 105                 110

Val Phe Leu Leu Asp Phe Ser Cys Tyr Lys Pro Asp Pro Ser Leu Ile
        115                 120                 125

Cys Thr Arg Glu Thr Phe Met Asp Arg Ser Gln Arg Val Gly Ile Phe
    130                 135                 140

Thr Glu Asp Asn Leu Ala Phe Gln Gln Lys Ile Leu Glu Arg Ser Gly
145                 150                 155                 160

Leu Gly Gln Lys Thr Tyr Phe Pro Glu Ala Leu Leu Arg Val Pro Pro
                165                 170                 175

Asn Pro Cys Met Glu Glu Ala Arg Lys Glu Ala Glu Thr Val Met Phe
            180                 185                 190

Gly Ala Ile Asp Ser Val Leu Glu Lys Thr Gly Val Lys Pro Lys Asp
        195                 200                 205

Ile Gly Ile Leu Val Val Asn Cys Ser Leu Phe Asn Pro Thr Pro Ser
    210                 215                 220

Leu Ser Ala Met Ile Val Asn Lys Tyr Lys Leu Arg Gly Asn Ile Leu
225                 230                 235                 240

Ser Tyr Asn Leu Gly Gly Met Gly Cys Ser Ala Gly Leu Ile Ser Ile
                245                 250                 255
```

```
Asp Leu Ala Lys Gln Leu Leu Gln Val Gln Pro Asn Ser Tyr Ala Leu
            260                 265                 270

Val Val Ser Thr Glu Asn Ile Thr Leu Asn Trp Tyr Leu Gly Asn Asp
        275                 280                 285

Arg Ser Met Leu Leu Ser Asn Cys Ile Phe Arg Met Gly Gly Ala Ala
    290                 295                 300

Val Leu Leu Ser Asn Arg Ser Ser Asp Arg Thr Arg Ser Lys Tyr Gln
305                 310                 315                 320

Leu Ile His Pro Val Arg Thr His Lys Gly Ala Asn Asp Asn Ala Phe
                325                 330                 335

Gly Cys Val Tyr Gln Arg Glu Asp Asn Asn Glu Glu Glu Thr Ala Lys
            340                 345                 350

Ile Gly Val Ser Leu Ser Lys Asn Leu Met Ala Ile Ala Gly Glu Ala
        355                 360                 365

Leu Lys Thr Asn Ile Thr Thr Leu Gly Pro Leu Val Leu Pro Met Ser
    370                 375                 380

Glu Gln Ile Leu Phe Phe Pro Thr Leu Val Ala Arg Lys Ile Phe Lys
385                 390                 395                 400

Val Lys Lys Ile Lys Pro Tyr Ile Pro Asp Phe Lys Leu Ala Phe Glu
                405                 410                 415

His Phe Cys Ile His Ala Gly Gly Arg Ala Val Leu Asp Glu Ile Glu
            420                 425                 430

Lys Asn Leu Asp Leu Ser Glu Trp His Met Glu Pro Ser Arg Met Thr
        435                 440                 445

Leu Asn Arg Phe Gly Asn Thr Ser Ser Ser Ser Leu Trp Tyr Glu Leu
    450                 455                 460

Ala Tyr Ser Glu Ala Lys Gly Arg Ile Lys Arg Gly Asp Arg Thr Cys
465                 470                 475                 480

Gln Ile Ala Phe Gly Ser Gly Phe Lys Cys Asn Ser Ala Val Trp Lys
                485                 490                 495

Ala Leu Arg Thr Ile Asp Pro Ile Asp Glu Lys Lys Asn Pro Trp Ser
            500                 505                 510

Asp Glu Ile His Glu Phe Pro Val Ser Val Pro Arg Ile Thr Pro Val
        515                 520                 525

Thr Ser Asn
    530
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<210> 28
<211> 622
<212> DNA
<213> Tropaeolum majus

<220>
<221> CDS
<222> (1)..(621)

<400> 28

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aag ctt aaa cta gta tac cat tac ttg atc tcc aac gcc atg tat ttg   48
Lys Leu Lys Leu Val Tyr His Tyr Leu Ile Ser Asn Ala Met Tyr Leu
  1               5                  10                  15

tta atg gtg ccg ctt cta gca gta gcc ttt gct cat ctc tcc acg ttg   96
Leu Met Val Pro Leu Leu Ala Val Ala Phe Ala His Leu Ser Thr Leu
             20                  25                  30

acg att caa gat ctg gtt cat ctt tgg gaa cag ctt aag ttc aat tta   144
Thr Ile Gln Asp Leu Val His Leu Trp Glu Gln Leu Lys Phe Asn Leu
         35                  40                  45

ctg tca gta act ctc tgc tcg agc ctt atg gtg ttt tta ggg act ctg   192
Leu Ser Val Thr Leu Cys Ser Ser Leu Met Val Phe Leu Gly Thr Leu
     50                  55                  60

tat ttc atg agc cga ccg acg aag att tac ttg gtg gat ttc tct tgt   240
Tyr Phe Met Ser Arg Pro Thr Lys Ile Tyr Leu Val Asp Phe Ser Cys
 65                  70                  75                  80

tac aag ccg gaa aaa gag cgt ata tgc acg aga gag att ttc tat gag   288
Tyr Lys Pro Glu Lys Glu Arg Ile Cys Thr Arg Glu Ile Phe Tyr Glu
                 85                  90                  95

aga tcg aaa cta act ggg aat ttt acc gat gat aat tta act ttc caa   336
Arg Ser Lys Leu Thr Gly Asn Phe Thr Asp Asp Asn Leu Thr Phe Gln
            100                 105                 110

aag aaa att atc gaa aga tct gga tta ggt cag aac acg tac tta cct   384
Lys Lys Ile Ile Glu Arg Ser Gly Leu Gly Gln Asn Thr Tyr Leu Pro
        115                 120                 125

gag gcc gtt cta cgg gtt ccg ccc aat ccg tgt atg gcg gag gct aga   432
Glu Ala Val Leu Arg Val Pro Pro Asn Pro Cys Met Ala Glu Ala Arg
    130                 135                 140

aag gag gct gag atg gtt atg ttc ggt gcg atc gat gaa ttg ttg gag   480
Lys Glu Ala Glu Met Val Met Phe Gly Ala Ile Asp Glu Leu Leu Glu
145                 150                 155                 160
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```
aaa acc ggg gtt aaa cct aag gat atc ggt att ctt gtg gtg aat tgc   528
Lys Thr Gly Val Lys Pro Lys Asp Ile Gly Ile Leu Val Val Asn Cys
                165                 170                 175

agc ttg ttc aat ccg acg ccg tct ctg tcc gca atg gtg gtt aat cgg   576
Ser Leu Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Val Val Asn Arg
            180                 185                 190

tac aag ctt aga ggg aat atc ata agt tat aac ctt ggc ggg atg g     622
Tyr Lys Leu Arg Gly Asn Ile Ile Ser Tyr Asn Leu Gly Gly Met
        195                 200                 205
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<210> 29
<211> 207
<212> PRT
<213> Tropaeolum majus

<400> 29

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Lys Leu Lys Leu Val Tyr His Tyr Leu Ile Ser Asn Ala Met Tyr Leu
  1               5                  10                  15

Leu Met Val Pro Leu Leu Ala Val Ala Phe Ala His Leu Ser Thr Leu
             20                  25                  30

Thr Ile Gln Asp Leu Val His Leu Trp Glu Gln Leu Lys Phe Asn Leu
         35                  40                  45

Leu Ser Val Thr Leu Cys Ser Ser Leu Met Val Phe Leu Gly Thr Leu
     50                  55                  60

Tyr Phe Met Ser Arg Pro Thr Lys Ile Tyr Leu Val Asp Phe Ser Cys
 65                  70                  75                  80

Tyr Lys Pro Glu Lys Glu Arg Ile Cys Thr Arg Glu Ile Phe Tyr Glu
                85                  90                  95

Arg Ser Lys Leu Thr Gly Asn Phe Thr Asp Asp Asn Leu Thr Phe Gln
            100                 105                 110

Lys Lys Ile Ile Glu Arg Ser Gly Leu Gly Gln Asn Thr Tyr Leu Pro
        115                 120                 125

Glu Ala Val Leu Arg Val Pro Pro Asn Pro Cys Met Ala Glu Ala Arg
    130                 135                 140

Lys Glu Ala Glu Met Val Met Phe Gly Ala Ile Asp Glu Leu Leu Glu
145                 150                 155                 160

Lys Thr Gly Val Lys Pro Lys Asp Ile Gly Ile Leu Val Val Asn Cys
                165                 170                 175

Ser Leu Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Val Val Asn Arg
            180                 185                 190
```

Tyr Lys Leu Arg Gly Asn Ile Ile Ser Tyr Asn Leu Gly Gly Met
195 200 205

<210> 30
<211> 11
<212> PRT
<213> Simmondsia chinensis

<400> 30
Glu Thr Tyr Val Pro Glu Ser Val Thr Lys Lys
1 5 10

<210> 31
<211> 10
<212> PRT
<213> Simmondsia chinensis

<220>
<221> MOD_RES
<222> (3)
<223> Unknown

<220>
<221> MOD_RES
<222> (10)
<223> Unknown

<400> 31
Val Pro Xaa Glu Pro Ser Ile Ala Ala Xaa
1 5 10

<210> 32
<211> 10
<212> PRT
<213> Simmondsia chinensis

<400> 32
Glu Thr Tyr Val Pro Glu Glu Val Thr Lys
1 5 10

<210> 33
<211> 11
<212> PRT
<213> Simmondsia chinensis

<400> 33
Asp Leu Met Ala Val Ala Gly Glu Ala Leu Lys
1 5 10

<210> 34
<211> 11
<212> PRT
<213> Simmondsia chinensis

<400> 34
Met Thr Asn Val Lys Pro Tyr Ile Pro Asp Phe
1 5 10

<210> 35
<211> 11
<212> PRT
<213> Simmondsia chinensis

<220>
<221> MOD_RES
<222> (4)..(5)
<223> Unknown

<400> 35
Phe Leu Pro Xaa Xaa Val Ala Ile Thr Gly Glu
1 5 10

<210> 36
<211> 17
<212> PRT
<213> Simmondsia chinensis

<220>
<221> MOD_RES
<222> (7)..(8)
<223> Unknown

<220>
<221> MOD_RES
<222> (11)
<223> Unknown

<400> 36
Phe Gly Asn Thr Ser Ser Xaa Xaa Leu Tyr Xaa Glu Leu Ala Tyr Ala
1 5 10 15

Lys

<210> 37
<211> 17
<212> PRT
<213> Simmondsia chinensis

<400> 37
Ala Glu Ala Glu Glu Val Met Tyr Gly Ala Ile Asp Glu Val Leu Glu
1 5 10 15

Lys

<210> 38
<211> 23
<212> PRT
<213> Acinetobacter sp.

<220>
<221> MOD_RES
<222> (1)
<223> Unknown

<220>
<221> MOD_RES
<222> (17)
<223> Unknown

<400> 38
Xaa Asp Ile Ala Ile Ile Gly Ser Gly Ser Ala Gly Leu Ala Gln Ala
1 5 10 15

Xaa Ile Leu Lys Asp Ala Gly
20

<210> 39
<211> 13
<212> PRT
<213> Acinetobacter sp.

<220>
<221> MOD_RES
<222> (7)
<223> Unknown

<400> 39
Gln Gln Phe Thr Val Trp Xaa Asn Ala Ser Glu Pro Ser
1 5 10

<210> 40
<211> 6
<212> PRT
<213> Simmondsia chinensis

<400> 40
Asn Ile Thr Thr Leu Gly
1 5

<210> 41
<211> 6
<212> PRT
<213> Simmondsia chinensis

<400> 41
Ser Asn Cys Lys Phe Gly
1 5

<210> 42
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<220>
<221> modified_base
<222> (9)
<223> a, c, t, g, other or unknown

<220>
<221> modified_base
<222> (12)
<223> a, c, t, g, other or unknown

<220>
<221> modified_base
<222> (15)
<223> a, c, t, g, other or unknown

<400> 42
aayathacna cnytngg 17

<210> 43
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic primer

<220>
<221> modified_base
<222> (15)
<223> a, c, t, g, other or unknown

<400> 43
swrttrcayt traancc 17

<210> 44
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Combined DNA/RNA Molecule:
Synthetic primer

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 44
caucaucauc augtcgacaa aatgacgtcc attaacgtaa ag 42

<210> 45
<211> 50
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Combined DNA/RNA Molecule:
Synthetic primer

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 45
cuacuacuac uagtcgacgg atcctatttg gaagctttga cattgtttag 50

<210> 46
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<220>
<221> MOD_RES
<222> (3)
<223> Leu or Gly

<400> 46
Lys Leu Xaa Tyr His Tyr
1 5

<210> 47
<211> 41
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Combined DNA/RNA Molecule:
Synthetic primer

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<220>
<221> modified_base
<222> (30)
<223> a, c, t, g, other or unknown

<220>
<221> modified_base
<222> (33)
<223> a, c, t, g, other or unknown

<400> 47
caucaucauc augaattcaa gcttaarytn bkntaycayt a 41

<210> 48
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 48
Asn Leu Gly Gly Met Gly Cys
1 5

<210> 49
<211> 41
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Combined DNA/RNA Molecule:
Synthetic primer

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<220>
<221> modified_base
<222> (30)
<223> a, c, t, g, other or unknown

<220>
<221> modified_base
<222> (33)
<223> a, c, t, g, other or unknown

<220>
<221> modified_base
<222> (36)
<223> a, c, t, g, other or unknown

<400> 49
caucaucauc augaattcaa gcttaayytn ggnggnatgg g 41

<210> 50
<211> 40
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Combined DNA/RNA Molecule:
Synthetic primer

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<220>
<221> modified_base
<222> (29)
<223> a, c, t, g, other or unknown

<220>
<221> modified_base
<222> (32)
<223> a, c, t, g, other or unknown

<220>
<221> modified_base
<222> (35)
<223> a, c, t, g, other or unknown

<400> 50
cuacuacuac uaggatccgt cgacccatnc cnccnarrtt 40

<210> 51
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 51
Gly Phe Lys Cys Asn Ser
1 5

<210> 52
<211> 41
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Combined DNA/RNA Molecule: Synthetic primer

<220>
<223> Description of Artificial Sequence: Synthetic primer

<220>
<221> modified_base
<222> (39)
<223> a, c, t, g, other or unknown

<400> 52
cuacuacuac uaggatccgt cgacswrttr cayttraanc c 41

<210> 53
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Combined DNA/RNA Molecule: Synthetic primer

<220>
<223> Description of Artificial Sequence: Synthetic primer

<220>
<221> modified_base
<222> (27)
<223> a, c, t, g, other or unknown

<400> 53
cuacuacuac uaswrttrca yttraancc 29